EL-MOASSER

Mathematics

By a group of supervisors

FREE GIFT NOT FOR SALE

PARENTS' GUIDE

Interactive E-learning Application

معاك
Ma3ak App

بتصريح وتحت إشراف
MINISTRY OF EDUCATION AND TECHNICAL EDUCATION
وزارة التربية والتعليم والتعليم الفني

SECOND TERM

5th
PRIMARY
2023

Index of Primary 5

UNIT 7

Adding and Subtracting Fractions

UNIT 8

Adding and Subtracting Mixed Numbers

Index of Primary 5

Index of Primary 5

UNIT 7

Adding and Subtracting Fractions

» **Concept 1 :** Adding and Subtracting Fractions with Unlike Denominators
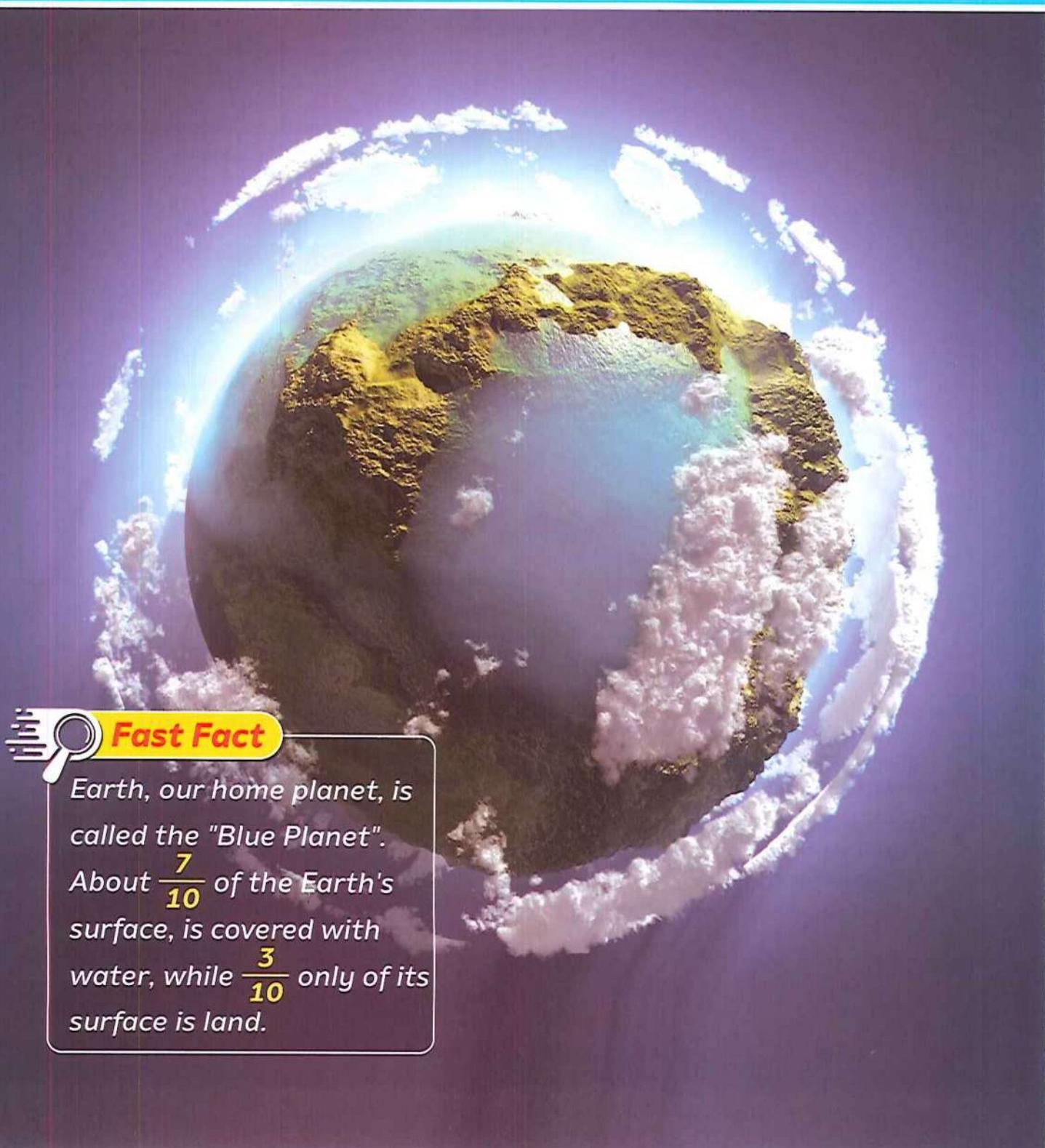
Fast Fact

Earth, our home planet, is called the "Blue Planet". About $\frac{7}{10}$ of the Earth's surface, is covered with water, while $\frac{3}{10}$ only of its surface is land.

Equivalent fractions

- Fractions that name the same amount are called **equivalent fractions**

For Example : Hany cut his pizza into 4 equal slices and his sister Noha cut her pizza into 8 equal slices. After eating some slices were left as shown.

What fraction of Hany pizza is left ?

What fraction of Noha pizza is left ?

Answer

The left is 3 slices out of 4 equal slices

$\dfrac{3}{4}$

The left is 6 slices out of 8 equal slices

$\dfrac{6}{8}$

Since, Hany and Noha left the same amount of pizza , then the two fractions $\dfrac{3}{4}$ and $\dfrac{6}{8}$ represent the same amount,

so, $\dfrac{3}{4}$ and $\dfrac{6}{8}$ are called equivalent fractions.

Examples for equivalent fractions
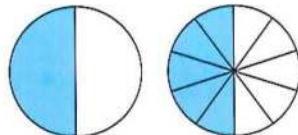
$$\dfrac{1}{2} = \dfrac{5}{10}$$
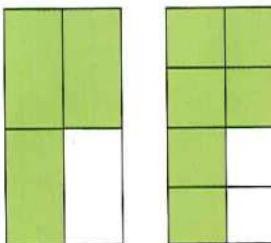
$$\dfrac{3}{4} = \dfrac{6}{8}$$
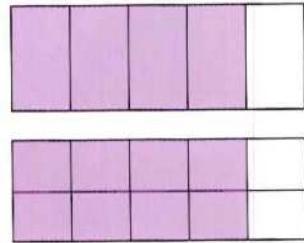
$$\dfrac{4}{5} = \dfrac{8}{10}$$

How to find equivalent fractions to a given one ?

To get an equivalent fraction to a given one you can multiply or divide both of numerator and denominator by the same non-zero number.

Example 1

Find four equivalent fractions to $\frac{8}{24}$

Solution

- $\overset{\times 2}{\underset{\times 2}{\frac{8}{24}}} = \frac{16}{48}$
- $\overset{\div 8}{\underset{\div 8}{\frac{8}{24}}} = \frac{1}{3}$
- $\overset{\times 3}{\underset{\times 3}{\frac{8}{24}}} = \frac{24}{72}$
- $\overset{\div 4}{\underset{\div 4}{\frac{8}{24}}} = \frac{2}{6}$

- **There are many other solutions.**

✓ Check your understanding

1. Complete.

- $\frac{2}{8} = \frac{6}{} = \frac{}{16} = \frac{}{4} = \frac{}{}$

- $\frac{12}{18} = \frac{6}{} = \frac{}{6} = \frac{}{}$

Simplest form of a fraction :

- Means the numerator and denominator are smallest numbers possible.
- That satisfied when the only common factor of the numerator and denominator is 1

How can you simplify fraction to simplest form ?

Answer : By dividing both of numerator and denominator by their greatest common factor [GCF]

Example 2

Write each of the following fractions in the simplest form.

a. $\dfrac{24}{32}$

b. $\dfrac{14}{49}$

c. $2\dfrac{8}{24}$

Solution

Example 2

Use models to find.

a. $\dfrac{1}{6}$ + $\dfrac{1}{3}$

b. $\dfrac{7}{8}$ − $\dfrac{1}{2}$

Solution

a.

$$\dfrac{1}{6} \; + \; \dfrac{2}{6} \; = \; \dfrac{3}{6} \; = \; \dfrac{1}{2}$$

b.
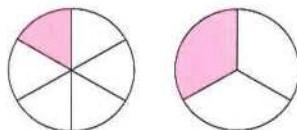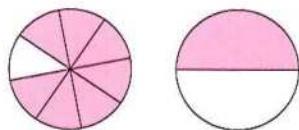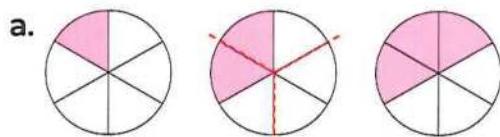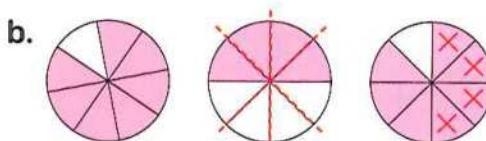
$$\dfrac{7}{8} \; - \; \dfrac{4}{8} \; = \; \dfrac{3}{8}$$

✓ Check your understanding

Find.

a. $\dfrac{5}{16} + \dfrac{3}{8}$

c. $\dfrac{2}{7} + \dfrac{3}{14}$

b. $\dfrac{7}{9} - \dfrac{1}{3}$

d. $\dfrac{7}{10} - \dfrac{1}{5}$

Learn ② Adding and subtracting unlike denominator fractions

1 To add or subtract fractions of unlike denominators, first you must write the fractions with like denominator.

2 We take the LCM of the two denominator as like denominator of the two fractions.

Problem : Find.

a. $\dfrac{3}{10} + \dfrac{4}{15}$

b. $\dfrac{7}{8} - \dfrac{1}{6}$

Answer :

a.

$$\dfrac{3}{10} + \dfrac{4}{15}$$

LCM of the two denominators is 30

$$\dfrac{9}{30} + \dfrac{8}{30}$$

Take 30 as a common denominator and replace each fraction by an equivalent one.

Remember

10 → 2, 5   15 → 3, 5

10 = 2 × 5
15 =   5 × 3
LCM = 2 × 5 × 3 = 30
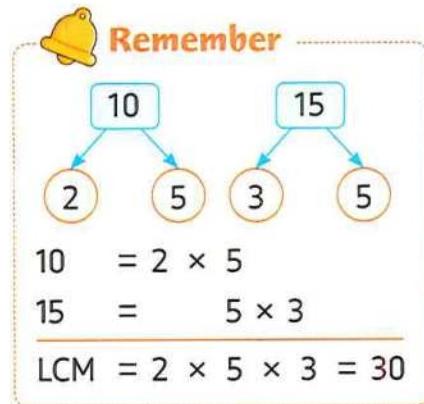
$$\dfrac{3}{10} + \dfrac{4}{15} = \dfrac{9}{30} + \dfrac{8}{30} = \dfrac{17}{30}$$

b.

$$\dfrac{7}{8} - \dfrac{1}{6}$$

LCM of the two denominators is 24

$$\dfrac{21}{24} - \dfrac{4}{24}$$

Take 24 as a common denominator and replace each fraction by an equivalent one.

Remember

8 → 2, 4 → 2, 2   6 → 2, 3

8 = 2 × 2 × 2
6 = 2   × 3
LCM = 2 × 2 × 2 × 3 = 24
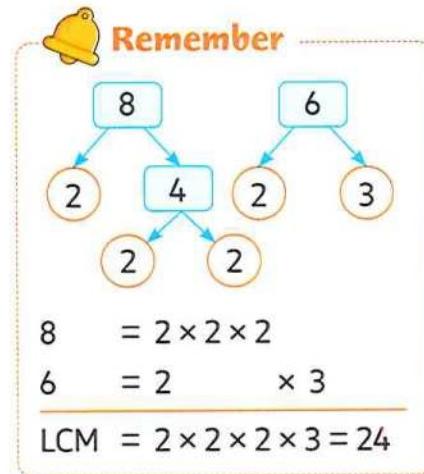
$$\dfrac{7}{8} - \dfrac{1}{6} = \dfrac{21}{24} - \dfrac{4}{24} = \dfrac{17}{24}$$

Example 3

Find.

a. $\dfrac{2}{3} + \dfrac{3}{4}$

b. $\dfrac{1}{2} - \dfrac{1}{5}$

c. $1 + \dfrac{9}{10} + \dfrac{3}{5}$

d. $2 - \dfrac{2}{9} - \dfrac{5}{6}$

Solution

a. $\dfrac{2}{3} + \dfrac{3}{4} = \dfrac{8}{12} + \dfrac{9}{12} = \dfrac{17}{12} = 1\dfrac{5}{12}$

b. $\dfrac{1}{2} - \dfrac{1}{5} = \dfrac{5}{10} - \dfrac{2}{10} = \dfrac{3}{10}$

c. $1 + \dfrac{9}{10} + \dfrac{3}{5} = \dfrac{10}{10} + \dfrac{9}{10} + \dfrac{6}{10} = \dfrac{25}{10} = \dfrac{5}{2} = 2\dfrac{1}{2}$

d. $2 - \dfrac{2}{9} - \dfrac{5}{6} = \dfrac{36}{18} - \dfrac{4}{18} - \dfrac{15}{18} = \dfrac{32}{18} - \dfrac{15}{18} = \dfrac{17}{18}$

✓ Check your understanding

Find each of the following, then use estimation to check reasonability of your answer.

a. $\dfrac{3}{8} + \dfrac{1}{3}$

b. $\dfrac{7}{9} - \dfrac{1}{6}$

c. $\dfrac{2}{5} + \dfrac{3}{8} + 1$

d. $1 - \dfrac{1}{4} - \dfrac{1}{5}$

Exercise 3
on lessons 4&5

- **Adding and Subtracting Fractions with Unlike Denominators, Part 1**
- **Adding and Subtracting Fractions with Unlike Denominators, Part 2**

● REMEMBER   ● UNDERSTAND   ○ APPLY   ❖ PROBLEM SOLVING   📖 From the school book

1. Find each of the following.

a.

____ + ____ = ____

b.

____ + ____ = ____

c.

____ + ____ = ____

d.

____ − ____ = ____

e.

____ − ____ = ____
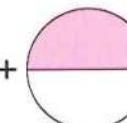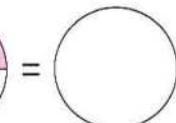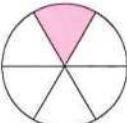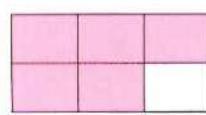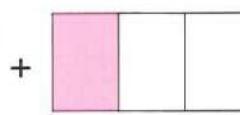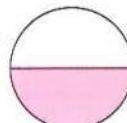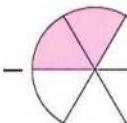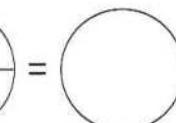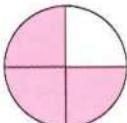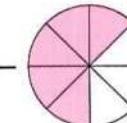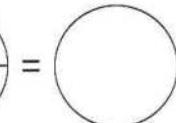
f.

____ − ____ = ____
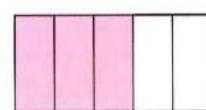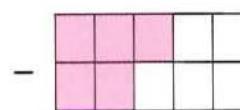
2. Evaluate by rewriting the fractions with like denominators. Use estimation to check that your answer is reasonable.

Problem	Evaluation by rewriting fractions with like denominator	Estimation using benchmarks	Reasonable / Not reasonable
a. $\frac{1}{2} + \frac{1}{8}$	$\frac{}{} + \frac{}{} = \frac{}{}$	___ + ___ = ___	___
b. 📖 $\frac{3}{4} + \frac{5}{12}$	$\frac{}{} + \frac{}{} = \frac{}{}$	___ + ___ = ___	___
c. 📖 $\frac{15}{15} - \frac{2}{3}$	$\frac{}{} - \frac{}{} = \frac{}{}$	___ − ___ = ___	___
d. $\frac{5}{8} - \frac{1}{2}$	$\frac{}{} - \frac{}{} = \frac{}{}$	___ − ___ = ___	___

31

● REMEMBER   ● UNDERSTAND   ○ APPLY   ⚙ PROBLEM SOLVING

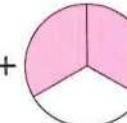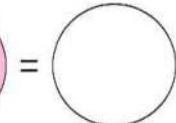|			
e. 📖 $\frac{7}{9} - \frac{1}{3}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{}$
f. $\frac{4}{5} + \frac{1}{20}$	$\frac{}{} + \frac{}{} = \frac{}{}$	$\frac{}{} + \frac{}{} = \frac{}{}$	$\frac{}{}$
g. 📖 $\frac{1}{2} + \frac{11}{12}$	$\frac{}{} + \frac{}{} = \frac{}{}$	$\frac{}{} + \frac{}{} = \frac{}{}$	$\frac{}{}$
h. 📖 $\frac{5}{8} - \frac{1}{2}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{}$
i. $\frac{3}{5} + \frac{7}{10}$	$\frac{}{} + \frac{}{} = \frac{}{}$	$\frac{}{} + \frac{}{} = \frac{}{}$	$\frac{}{}$
j. $\frac{7}{14} + \frac{1}{7}$	$\frac{}{} + \frac{}{} = \frac{}{}$	$\frac{}{} + \frac{}{} = \frac{}{}$	$\frac{}{}$
k. $\frac{5}{9} - \frac{1}{3}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{}$
l. 📖 $\frac{7}{9} - \frac{2}{3}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{}$
m. 📖 $\frac{6}{7} - \frac{3}{14}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{}$
n. $\frac{5}{12} - \frac{1}{4}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{}$
o. $\frac{5}{6} - \frac{4}{30}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{}$
p. $\frac{3}{4} + \frac{5}{8}$	$\frac{}{} + \frac{}{} = \frac{}{}$	$\frac{}{} + \frac{}{} = \frac{}{}$	$\frac{}{}$
q. 📖 $\frac{4}{5} - \frac{3}{10}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{}$
r. 📖 $\frac{5}{12} - \frac{7}{36}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{}$
s. 📖 $\frac{2}{3} - \frac{17}{30}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{} - \frac{}{} = \frac{}{}$	$\frac{}{}$
t. $\frac{5}{9} + \frac{1}{18}$	$\frac{}{} + \frac{}{} = \frac{}{}$	$\frac{}{} + \frac{}{} = \frac{}{}$	$\frac{}{}$

3. 📖 Estimate each sum or difference. Then, evaluate each expression by rewriting the fractions with like denominators.

a. $\frac{1}{3} + \frac{1}{4} = $ ____   b. $\frac{1}{2} - \frac{2}{5} = $ ____   c. $\frac{1}{3} - \frac{1}{4} = $ ____

d. $\frac{5}{6} + \frac{3}{8} = $ ____   e. $\frac{1}{2} + \frac{2}{5} = $ ____   f. $\frac{5}{6} - \frac{3}{8} = $ ____

g. $\frac{3}{5} + \frac{1}{3} = $ ____   h. $\frac{1}{6} + \frac{5}{8} = $ ____   i. $\frac{11}{12} - \frac{7}{8} = $ ____

j. $\frac{7}{9} - \frac{1}{6} = $ ____   k. $\frac{1}{5} + \frac{1}{2} = $ ____   l. $\frac{1}{8} + \frac{3}{5} + \frac{9}{10} = $ ____

m. $\frac{5}{9} + \frac{1}{2} = $ ____   n. $1 - \frac{1}{4} - \frac{1}{6} = $ ____   o. $\frac{3}{4} - \frac{1}{3} = $ ____

p. $1 + \frac{7}{10} + \frac{3}{4} = $ ____   q. $\frac{1}{2} + \frac{1}{3} = $ ____   r. $2 - \frac{7}{9} - \frac{1}{6} = $ ____

4. Add.

a. $\frac{1}{3} + \frac{1}{4}$ b. $\frac{1}{5} + \frac{1}{3}$ c. $\frac{1}{2} + \frac{1}{7}$

d. $\frac{1}{4} + \frac{1}{8}$ e. $\frac{1}{6} + \frac{1}{8}$ f. $\frac{3}{7} + \frac{1}{6}$

g. $\frac{2}{3} + \frac{3}{4}$ h. $\frac{3}{7} + \frac{4}{5}$ i. $\frac{1}{4} + \frac{3}{10}$

j. $\frac{7}{8} + \frac{5}{6}$ k. $\frac{2}{3} + \frac{7}{8}$ l. $\frac{5}{9} + \frac{2}{5}$

5. Subtract.

a. $\frac{1}{3} - \frac{1}{5}$ b. $\frac{5}{6} - \frac{1}{2}$ c. $\frac{5}{6} - \frac{1}{3}$

d. $\frac{1}{4} - \frac{1}{5}$ e. $\frac{4}{7} - \frac{1}{3}$ f. $\frac{2}{3} - \frac{1}{6}$

g. $\frac{2}{5} - \frac{1}{10}$ h. $\frac{4}{5} - \frac{1}{4}$ i. $\frac{9}{10} - \frac{3}{5}$

j. $\frac{5}{6} - \frac{2}{3}$ k. $\frac{7}{8} - \frac{2}{5}$ l. $\frac{5}{6} - \frac{3}{8}$

6. 📖 Who is correct? Soliman, Seif, and Samar each added these fractions. Who is correct? Why?

$$\frac{1}{12} + \frac{2}{3}$$

Soliman's answer: $\frac{9}{12}$ Seif's answer: $\frac{3}{15}$ Samar's answer: $\frac{3}{4}$

1. Is Soliman correct? Why or why not? ____

2. Is Seif correct? Why or why not? ____

3. Is Samar correct? Why or why not? ____

7. 📖 Abeer, Badr, Ehab, and Doha are making a quilt of 36 equal-sized fabric squares to represent flowering plants in Egypt. Abeer made squares for $\frac{11}{36}$ of the quilt's area. Badr made squares for $\frac{1}{6}$ of the quilt's area. What fraction of the quilt must Ehab make so that $\frac{1}{6}$ of the quilt's area will remain for Doha ?

Represent different squares needed for given fractions of a quilt. Label the diagram and explain your thinking.
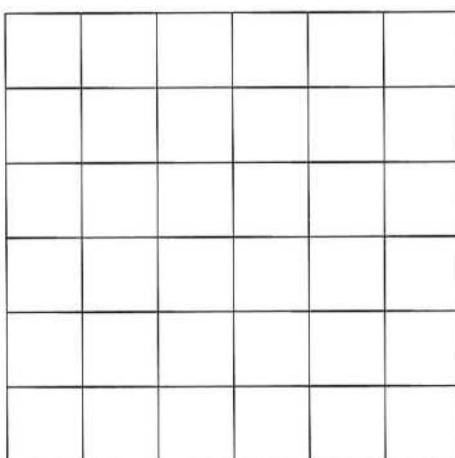
8. 📖 Write three different addition problems and three different subtraction problems using the given fractions. Then, find each sum or difference.

$$\frac{1}{2} \qquad \frac{4}{9} \qquad \frac{3}{8} \qquad \frac{5}{6} \qquad \frac{2}{5}$$

$$\frac{1}{21} \qquad \frac{8}{11} \qquad \frac{6}{7} \qquad \frac{7}{12} \qquad \frac{9}{10}$$

Choose the correct answer.

1. $\dfrac{2}{5} + \dfrac{3}{10} =$ _____

   A. $\dfrac{5}{15}$ B. $\dfrac{7}{10}$ C. $\dfrac{5}{10}$ D. $\dfrac{1}{2}$

2. $\dfrac{3}{4} - \dfrac{5}{8} =$ _____

   A. $\dfrac{1}{4}$ B. $\dfrac{1}{8}$ C. $\dfrac{3}{8}$ D. $\dfrac{5}{8}$

3. + = _____

   A. 1   B. $\dfrac{5}{4}$

   C. $\dfrac{7}{8}$ D. $\dfrac{9}{8}$

4. − = _____
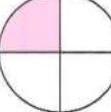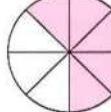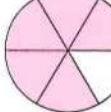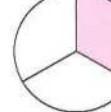
   A. $\dfrac{2}{6}$ B. $\dfrac{1}{2}$

   C. $\dfrac{5}{6}$ D. $\dfrac{1}{3}$

5. $\dfrac{5}{9} + \dfrac{1}{3} =$ _____

   A. $\dfrac{7}{9}$ B. $\dfrac{6}{12}$ C. $\dfrac{8}{9}$ D. $\dfrac{5}{27}$

6. $\dfrac{6}{7} - \dfrac{1}{42} =$ _____

   A. $\dfrac{5}{6}$ B. $\dfrac{6}{5}$ C. $\dfrac{1}{7}$ D. $\dfrac{36}{42}$

7. $\dfrac{2}{5} + \dfrac{3}{8} =$ _____

   A. $\dfrac{5}{40}$ B. $\dfrac{31}{40}$ C. $\dfrac{6}{40}$ D. $\dfrac{5}{13}$

8. $\dfrac{2}{7} + \dfrac{2}{5} =$ _____

   A. $\dfrac{4}{35}$ B. $\dfrac{4}{13}$ C. $\dfrac{4}{12}$ D. $\dfrac{24}{35}$

9. $\dfrac{4}{5} - \dfrac{3}{4} =$ _____

   A. $\dfrac{7}{20}$ B. $\dfrac{15}{20}$ C. $\dfrac{1}{20}$ D. $\dfrac{3}{20}$

10. $1 - \dfrac{1}{4} - \dfrac{1}{6} =$ _____

    A. $\dfrac{7}{12}$ B. $\dfrac{1}{12}$ C. $\dfrac{5}{6}$ D. $\dfrac{3}{4}$

11. $1 + \dfrac{1}{2} + \dfrac{3}{4} =$ _____

    A. $\dfrac{5}{6}$ B. $2\dfrac{1}{4}$ C. $2\dfrac{9}{20}$ D. $2\dfrac{1}{2}$

12. $\dfrac{5}{12} + \dfrac{1}{4} \bigcirc \dfrac{1}{3} + \dfrac{1}{4}$

    A. >   B. <   C. =

Solving Story Problems with Fractions

Learn ❶ Building arrays with color tiles to find the fractional parts of the model

Use 12 colored tiles : 5 green, 4 blue and 3 red
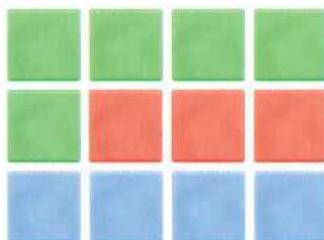
, then answer the following questions :

1 What fraction of the array is green ?
The answer : $\frac{5}{12}$

2 What fraction of the array is blue ?
The answer : $\frac{4}{12} = \frac{1}{3}$

3 What fraction of the array is red ?
The answer : $\frac{3}{12} = \frac{1}{4}$

4 What color represents $\frac{1}{3}$ of the array ?
The answer : blue

5 How many tiles equal $\frac{1}{4}$ of the array ?
The answer : 3 tiles

Japanese bento boxes are often divided into sections for different foods this bento box is divided into 5 sections

vegetable salad $\frac{1}{9}$

rice $\frac{1}{3}$ fruit $\frac{2}{9}$ sauce $\frac{1}{18}$ sushi $\frac{5}{18}$
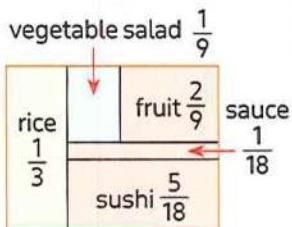
✓ **Check** your understanding

Use 16 tiles to build arrays with color tiles 4 red, 5 green and 7 blue.

1. What fraction of the array is green ? —————

2. What color represents $\frac{1}{4}$ of the array ? —————

Learn ② Solving story problems involving addition and subtraction with fractions

Problem : $\frac{1}{3}$ of the school garden has vegetables and $\frac{1}{2}$ of the garden has flowers, what part of the garden is left to grow grass ?

Answer : We have 2 methods to solve this problem.

1st method : Using addition and subtraction

1 Add $\frac{1}{3}$ and $\frac{1}{2}$ to find out what fraction represents vegetable and flowers parts.

$$\frac{1}{3} + \frac{1}{2} = \frac{2}{6} + \frac{3}{6} = \frac{5}{6}$$

LCM of 2 and 3 is 6

2 The whole garden is $1 = \frac{6}{6}$, then subtract vegetables and flowers parts from it to get the left part to grow grass.

$$\frac{6}{6} - \frac{5}{6} = \frac{1}{6}$$

2nd method : Using model tiles

1 Find LCM of the two given fraction denominators.

→ The LCM of 3 and 2 is 6

2 Draw tiles model consists of 6 equal parts.
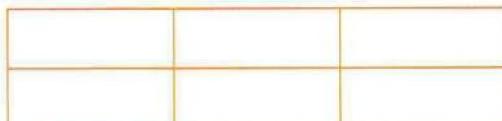
3 Write vegetable inside $\frac{1}{3}$ of the tiles and flowers inside $\frac{1}{2}$ of them and grass inside the left tiles.

flowers	flowers	flowers
vegetable	vegetable	grass

4 Deduce that $\frac{1}{6}$ of garden is left to grow grass.

Example 1

Students in a class completed a survey about their favourite sports, $\frac{2}{5}$ of the students favourite handball, $\frac{1}{4}$ of the students favourite basketball and the left students favourite football.

What is the fraction represents the students that their favourite sport is football ?

Solution

The fraction represents the students that their favourite sports are handball and basketball.

- $\frac{2}{5} + \frac{1}{4} = \frac{8}{20} + \frac{5}{20} = \frac{13}{20}$ ◦◦◦ *(LCM of 5 and 4 is 20)*

The fraction represents the student that their favourite sport is football.

- $1 - \frac{13}{20} = \frac{20}{20} - \frac{13}{20} = \frac{7}{20}$

, then $\frac{7}{20}$ of the students their favourite sport is football.

Another solution :

- LCM of denominators of $\frac{2}{5}$ and $\frac{1}{4}$ is 20

- Draw tiles model of 20 equal parts, in $\frac{2}{5}$ of them write handball, in $\frac{1}{4}$ of them write basketball and football in the left tiles.

handball	handball	handball	handball	handball
handball	handball	handball	basketball	basketball
basketball	basketball	basketball	football	football
football	football	football	football	football

- $\frac{7}{20}$ of the students their favourite sport is football.

✓ Check your understanding

Wael spends $\frac{4}{7}$ of his money on candy and $\frac{1}{5}$ of his money on toys and saves the left money.
What fraction of money does Wael save ?

_____

_____

_____

Learn ③ Story problems with fractions and whole numbers

Problem : Nancy read $\frac{1}{3}$ of a book in the morning and $\frac{2}{5}$ of the same book in the evening, then 32 pages of the book are left without reading.

What is the number of pages in the book ?

Answer : **1** LCM of 5 and 3 is 15

2 Draw model tiles of 15 equal parts.
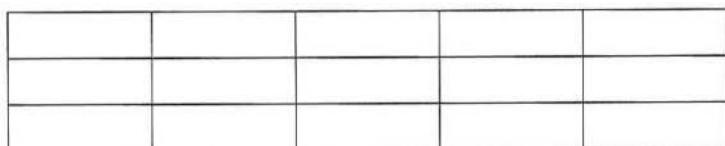
3 Write on $\frac{1}{3}$ of tiles "morning", on $\frac{2}{5}$ of tiles write evening and on the left tiles write "left".

morning	morning	morning	morning	morning
evening	evening	evening	evening	evening
evening	left	left	left	left

4 $\frac{4}{15}$ of the book is left which is 32 pages,

since $4 \times 8 = 32$, then each tile represents 8 pages.

$$\frac{4}{15} \overset{\times 8}{\underset{\times 8}{=}} \frac{32}{120}$$

8	8	8	8	8
8	8	8	8	8
8	8	8	8	8

Then, the book pages
$= 15 \times 8 = 120$ pages.

Note that

The previous problem can be solved as the following.

1 Find fraction of read pages in morning and evening $= \frac{1}{3} + \frac{2}{5} = \frac{5}{15} + \frac{6}{15} = \frac{11}{15}$

2 Find fraction of left pages $= 1 - \frac{11}{15} = \frac{15}{15} - \frac{11}{15} = \frac{4}{15}$

3 $\frac{4}{15}$ of the book is 32 pages, then $\frac{4}{15} \overset{\times 8}{\underset{\times 8}{=}} \frac{32}{120}$

⟶ The number of all pages in the book is **120** pages.

Example 2

Hany has some small wodden cubes, he paints $\frac{1}{3}$ of them in green and $\frac{1}{4}$ of them in red and 15 cubes are left without painting.
What is the total number of cubes ?
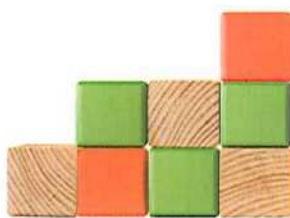
Solution 💡

1. The fraction of painted cubes $= \frac{1}{3} + \frac{1}{4} = \frac{4}{12} + \frac{3}{12} = \frac{7}{12}$

> LCM of 3 and 4 is 12

2. The fraction of left cubes $= 1 - \frac{7}{12} = \frac{12}{12} - \frac{7}{12} = \frac{5}{12}$

3. $\frac{5}{12}$ of cubes is 15 , $5 \times 3 = 15$

, then total number of cubes $= 12 \times 3 = 36$ cubes

> $\frac{5}{12} \xrightarrow{\times 3} = \xrightarrow{\times 3} \frac{15}{36}$

Another solution :

1. LCM of 3 and 4 is 12

2. Draw 12 tiles model.
$\frac{1}{3}$ of them for green and $\frac{1}{4}$ of them for red.

green	green	green	green
red	red	red	left
left	left	left	left

3. $\frac{5}{12}$ of cubes are left which are 15 cubes,

since $15 = 5 \times 3$, then each tile represents 3 cubes.

Total number of cubes $= 12 \times 3 = 36$

3	3	3	3
3	3	3	3
3	3	3	3

✓ Check your understanding

Roudy and Sama bought some cookies, Roudy ate $\frac{3}{8}$ of them and Sama ate $\frac{1}{3}$ of them and 14 cookies are left.
What is the number of cookies did Roudy and Sama buy ?

_____

_____

_____

_____

1. Soha likes chocolate. One day she bought a chocolate and ate $\frac{5}{9}$ of it in the morning and $\frac{1}{3}$ in the evening.

   How much part of the chocolate has she eaten ?

   _____

2. 📖 Omnia purchases $\frac{8}{9}$ kg of fava beans. She uses $\frac{3}{4}$ kg of the fava beans to make falafel. **How many kilograms of fava beans are left ?**

   _____

3. A piece of ribbon is $\frac{12}{15}$ m long. A piece of $\frac{4}{15}$ m is cut from it.

   What is the fraction of the remaining ribbon ?

   _____

4. Youssef spent $\frac{3}{4}$ of an hour biking and $\frac{5}{6}$ of an hour jogging. Afterwards, he swam for $\frac{1}{8}$ of an hour. **How much time did Youssef exercise before he went swimming ?**

5. To stay healthy, Emily decided to walk for $\frac{4}{5}$ km every day. She walked $\frac{2}{5}$ km to work and walked $\frac{1}{4}$ km at lunchtime. **How much more does she need to walk after dinner if she wants to meet her target distance ?**

   _____

6. If the cup can hold $\frac{1}{4}$ litre of liquid, Amira poured $\frac{1}{5}$ litre of milk into the cup, **how much milk can Amira add to get the cup full ?**

7. 📖 **Build arrays with color tiles to find the fractional parts of the model.**

a. Use 9 tiles, $\frac{1}{3}$ of which are red, and the remaining tiles are yellow.

    1. How many tiles are red? _____

        Therefore, $\frac{1}{3}$ of 9 tiles equal _____ tiles.

    2. How many tiles are yellow? _____

        Therefore, $\frac{2}{3}$ of 9 tiles equal _____ tiles.

b. Use 16 tiles : 8 red, 4 yellow, 3 green, and 1 blue.

    1. What fraction of the array is red? _____

        Therefore, $\frac{1}{2}$ of 16 tiles equal _____ tiles.

    2. What fraction of the array is yellow? _____

        Therefore, $\frac{1}{4}$ of 16 tiles equal _____ tiles.

c. Use 12 tiles : 4 blue, 3 green, 3 yellow, and the rest red.

    1. What fraction of the array is green? _____

    2. What fraction of the array is red? _____

    3. What color represents $\frac{1}{3}$ of the array? _____

    4. How many tiles do $\frac{1}{4}$ of 12 tiles represent? _____

d. Use the fewest tiles possible to build an array that is $\frac{1}{4}$ blue, $\frac{2}{5}$ green, $\frac{1}{10}$ yellow, and the rest red.

    1. How many tiles did you use altogether? _____

    2. How many tiles are included in $\frac{1}{4}$ of the array? _____

    3. How many tiles equal $\frac{2}{5}$ of the array? _____

    4. Two tiles are what fraction of the array? _____

8. Mother ate $\frac{1}{3}$ of the cake and father $\frac{3}{8}$.

   How much of the cake has been eaten and how much is left ?

   _____

9. 📖 Wafaa's flower garden consists of $\frac{3}{7}$ cornflowers and $\frac{2}{5}$ poppies. The rest of the garden is filled with roses. **What fraction of the Wafaa's garden is roses ?**

   _____

10. 📖 In the pond, $\frac{1}{3}$ of the lilies are white and $\frac{1}{4}$ of the lilies are pink. The remaining lilies are blue. **What fraction of the lilies are blue ?**

    _____

11. Nancy spends $\frac{2}{7}$ of her salary for food and uses $\frac{1}{2}$ of her salary for paying the house rent. **What fraction of salary is left ?**

    _____

12. Eslam spent $\frac{1}{2}$ of his Sunday doing homework and $\frac{1}{5}$ of the day watching cricket. **What part of the day was left to do other things ?**

    _____

13. 📖 In the pond, $\frac{1}{3}$ of the lilies are white and $\frac{1}{4}$ of the lilies are pink. The remaining 30 lilies are blue. **How many lilies are in the pond all together ?**

    _____

14. 📖 Rania uses $\frac{3}{4}$ of her monthly salary to pay for her food, rent, utilities, and transportation. After these expenses, she is left with 1,250 L.E.

    What is Rania's monthly salary ?

    _____

15. 📖 Ziad had 40 date palm trees for sale at his nursery. He sold $\frac{2}{5}$ of the trees on Monday. He sold $\frac{1}{4}$ of the remaining trees on Tuesday. Wednesday, he sold $\frac{1}{2}$ of what was left.

How many date palm trees did Ziad have remaining to sell on Thursday ?

_____

16. 📖 Osman expected his assignment to take $\frac{4}{5}$ of an hour. He completed it in $\frac{3}{4}$ of an hour.

In how many fewer minutes did Osman complete his assignment than he expected ?

_____

17. 📖 In Wafaa's flower garden, $\frac{3}{7}$ of the plants are cornflowers and $\frac{2}{5}$ are poppies. The rest of the garden is filled with 6 rose plants.
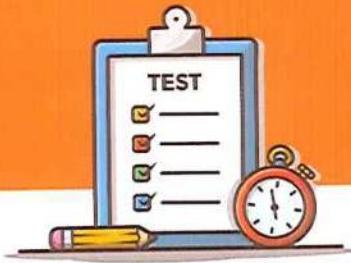
How many flower plants could be in Wafaa's garden ?

Your classmate says the answer to the question is $\frac{6}{35}$.

Do you agree ? Why or why not ?

_____

_____

Unit Seven Assessment

1. Choose the correct answer.

a. $\frac{5}{6} - \frac{3}{5} = $ _____

   A. $\frac{8}{30}$ B. $\frac{9}{20}$ C. $\frac{7}{30}$ D. $\frac{3}{4}$

b. Which of the following is overestimate ?

   A. $\frac{8}{7} + \frac{5}{9} = 1\frac{1}{2}$ B. $\frac{4}{7} + \frac{3}{5} = 1$ C. $\frac{1}{6} + \frac{6}{11} = \frac{1}{2}$ D. $\frac{4}{9} + \frac{3}{7} = 1$

c. Equivalent fraction of $\frac{2}{8}$ is _____

   A. $\frac{4}{8}$ B. $\frac{2}{4}$ C. $\frac{1}{4}$ D. $\frac{4}{10}$

d. The smallest like denominator of $\frac{2}{3}$ and $\frac{3}{4}$ is _____

   A. 6   B. 8   C. 24   D. 12

e. $1 - \frac{1}{3} - \frac{1}{5} = $ _____

   A. $\frac{7}{20}$ B. $\frac{7}{15}$ C. $\frac{12}{17}$ D. $\frac{5}{8}$

f. $-$ $= $ _____

   A. $\frac{1}{4}$ B. $\frac{1}{2}$ C. $\frac{1}{8}$ D. $\frac{5}{8}$

g. $\frac{5}{7} - \frac{\underline{}}{\underline{}} = \frac{1}{7}$

   A. $\frac{1}{7}$ B. $\frac{4}{7}$ C. $\frac{5}{7}$ D. $\frac{6}{7}$

2. Complete.

a. $\frac{1}{2} + \frac{2}{5} = $ _____

b. Simplest form of $\frac{15}{27}$ is _____

c. Change $\frac{5}{6}$ and $\frac{7}{12}$ into two like denominator fractions _____ , _____

d. $\frac{17}{10} - \frac{4}{10} = $ _____ $= \frac{\underline{}}{\underline{}}$

e. $\frac{8}{32} = \frac{4}{\underline{}}$

f. LCM of the denominators of $\frac{2}{5}$ and $\frac{1}{3}$ is _____

g. $\frac{7}{13} + \frac{2}{13} - $ _____ $= \frac{4}{13}$

h. $\frac{7}{9} - \frac{3}{7} = $ _____

45

3. Choose the correct answer.

a. is equivalent to _____

    A.   **B.**   **C.**   **D.**
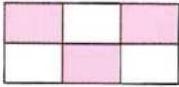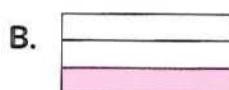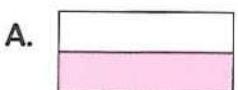
b. $\frac{2}{4}$ is equivalent to _____

    A. $\frac{5}{8} - \frac{1}{4}$ **B.** $\frac{7}{8} - \frac{1}{4}$ **C.** $\frac{5}{6} - \frac{1}{3}$ **D.** $1 - \frac{5}{8}$

c. $\frac{7}{8} - \frac{2}{3} =$ _____

    A. $\frac{5}{5}$ **B.** $\frac{5}{20}$ **C.** $\frac{5}{8}$ **D.** $\frac{5}{24}$

d. $1 - \frac{1}{4} - \frac{2}{3} =$ _____

    A. $\frac{7}{12}$ **B.** $\frac{1}{12}$ **C.** $\frac{1}{2}$ **D.** $\frac{5}{12}$

e. $\frac{3}{4} + \frac{4}{5} =$ _____

    A. $\frac{7}{9}$ **B.** $\frac{7}{20}$ **C.** $1\frac{11}{20}$ **D.** $\frac{12}{20}$

f. $\frac{5}{6} - \frac{1}{3} =$ _____

    A. $\frac{4}{3}$ **B.** $\frac{1}{2}$ **C.** $\frac{4}{18}$ **D.** $\frac{4}{6}$

g. $1 - \underline{\hspace{1.5cm}} = \frac{5}{8}$

    A. $\frac{5}{8}$ **B.** $\frac{3}{8}$ **C.** $\frac{6}{8}$ **D.** $\frac{8}{7}$

4. Answer the following.

a. Marvina spend $\frac{1}{2}$ of her money to buy candy and $\frac{1}{3}$ of it to buy toys.

    What fraction of her money is left ?

_____

b. In the school day break, Hany spends $\frac{2}{3}$ of the break in eating and $\frac{1}{5}$ of it to take a drink, then 4 minute left. **What is the break time ?**

_____

c. Petra's flower garden consists of $\frac{3}{8}$ cornflowers and $\frac{1}{3}$ poppies. The rest of the garden is filled with roses. **What fraction of the Petra's garden is roses ?**

_____

d. **Estimate the sum and the difference using the benchmarks 0 , $\frac{1}{2}$ and 1**

    1. $\frac{7}{8} + \frac{1}{5} =$ _____   **2.** $\frac{5}{9} + \frac{4}{7} =$ _____

UNIT 8

Adding and Subtracting Mixed Numbers

» **Concept 1 :** Working with Mixed Numbers with Like and Unlike Denominators

» **Concept 2 :** Adding and Subtracting Mixed Numbers with Unlike Denominators

Fast Fact

Hippos are considered the second largest land animal on Earth (first place goes to the elephant!).

Males measure around $3\frac{1}{2}$ m long and $1\frac{1}{2}$ m tall, and can weigh up 3,200kg. That's as much as three small cars!

Working with Mixed Numbers with Like and Unlike Denominators

Fast Fact

Ostrich is the world's largest bird. It stands up to massive $2\frac{7}{10}$ m tall and weighs as much as 159kg – that's around 1m taller than the average man, and the weight of two men combined ! Also, its egg is the largest egg in the world, averaging around 15 cm long weighing up to a mega $1\frac{1}{2}$ kg!

Lesson No.	Lesson Name	Lesson Objectives
Lessons 1 to 3	Adding and Subtracting Mixed Numbers with Like Denominators	• Students will add and subtract mixed numbers with like denominators.
	Finding Like Denominators	• Students will generate pairs of mixed numbers with like denominators.
		• Students will explain how to find like denominators for mixed numbers.
	Estimation with Mixed Numbers	• Students will use benchmark fractions and number sense of mixed numbers to estimate mentally.

- **Adding and Subtracting Mixed Numbers with Like Denominators**
- **Finding Like Denominators**
- **Estimation with Mixed Numbers**

🔔 **Remember**

| Mixed number | ⟶ | Improper fraction | | Improper fraction | ⟶ | Mixed number |

$$2 \overset{+}{\underset{\times}{}} \frac{3}{4} \quad = \quad \frac{11}{4}$$

$$18 \div 7 = 2R4$$

$$\frac{18}{7} \quad = \quad 2\frac{4}{7}$$

| Mixed number | ⟶ | Equivalent mixed number |

Regroup 1 whole to $\frac{5}{5}$

$$3\frac{2}{5} \quad = \quad 2\frac{7}{5}$$

Learn ① Adding and subtracting mixed numbers with like denominators

❶ Adding and subtracting using improper fractions

1. Rewrite each mixed number as an improper fraction.

2. Add / Subtract the numerators.

Example :

- $2\frac{3}{5} + 3\frac{1}{5}$

$$\frac{13}{5} + \frac{16}{5} = \frac{29}{5} = 5\frac{4}{5}$$

- $7\frac{1}{4} - 5\frac{3}{4}$

$$\frac{29}{4} - \frac{23}{4} = \frac{6}{4} = \frac{3}{2} = 1\frac{1}{2}$$

❷ Adding and subtracting by decomposing the mixed numbers and simplifying the answer

1. Add / Subtract the whole parts.

2. Add / Subtract the fraction parts.

3. Combine the two resulted parts.

> **Note that**
> In some subtraction problems you need to regroup the minuend.

Example :

• $3\frac{2}{7} + 1\frac{3}{7}$

$= (3+1) + (\frac{2}{7} + \frac{3}{7})$

$= 4\frac{5}{7}$

• $11\frac{1}{6} - 5\frac{5}{6}$

> $11\frac{1}{6} = 10\frac{7}{6}$
> "regrouping"

$= 10\frac{7}{6} - 5\frac{5}{6}$

$= (10-5) + (\frac{7}{6} - \frac{5}{6})$

$= 5\frac{2}{6}$

$= 5\frac{1}{3}$

Example 1

Evaluate each sum or difference, simplify if possible.

a. $2\frac{1}{4} + 1\frac{1}{4}$

b. $6\frac{3}{4} - 5\frac{1}{4}$

c. $4\frac{5}{9} + 2\frac{7}{9}$

d. $8\frac{1}{5} - 3\frac{4}{5}$

Solution

a. $2\frac{1}{4} + 1\frac{1}{4} = \frac{9}{4} + \frac{5}{4} = \frac{14}{4} = 3\frac{2}{4} = 3\frac{1}{2}$

b. $6\frac{3}{4} - 5\frac{1}{4} = \frac{27}{4} - \frac{21}{4} = \frac{6}{4} = 1\frac{2}{4} = 1\frac{1}{2}$

c. $4\frac{5}{9} + 2\frac{7}{9} = \frac{41}{9} + \frac{25}{9} = \frac{66}{9} = 7\frac{3}{9} = 7\frac{1}{3}$

d. $8\frac{1}{5} - 3\frac{4}{5} = \frac{41}{5} - \frac{19}{5} = \frac{22}{5} = 4\frac{2}{5}$

Another solution :

a. $2\frac{1}{4} + 1\frac{1}{4} = (2+1) + (\frac{1}{4} + \frac{1}{4}) = 3\frac{2}{4} = 3\frac{1}{2}$

b. $6\frac{3}{4} - 5\frac{1}{4} = (6-5) + (\frac{3}{4} - \frac{1}{4}) = 1\frac{2}{4} = 1\frac{1}{2}$

c. $4\frac{5}{9} + 2\frac{7}{9} = [4+2] + [\frac{5}{9}+\frac{7}{9}] = 6\frac{12}{9} = 7\frac{3}{9} = 7\frac{1}{3}$

d. $8\frac{1}{5} - 3\frac{4}{5} = 7\frac{6}{5} - 3\frac{4}{5} = [7-3] + [\frac{6}{5}-\frac{4}{5}] = 4\frac{2}{5}$

✓ **Check** your understanding

a. $2\frac{1}{5} + 3\frac{3}{5}$

b. $4\frac{2}{3} - 1\frac{1}{3}$

c. $3\frac{3}{8} + 1\frac{5}{8}$

d. $5\frac{2}{7} - 3\frac{5}{7}$

Equations with fractions

• You can solve an equation with fractions in the same way you solve an equation with whole numbers : you get the variable alone on one side of the equal sign using properties of equality and inverse operations.

Example 2

Evaluate each of the following equations.

a. $3\frac{2}{5} + k = 6\frac{1}{5}$

b. $7\frac{2}{3} - b = 5\frac{1}{3}$

Solution 💡

a. $3\frac{2}{5} + k = 6\frac{1}{5}$ ⟹ [Use inverse operation]

$k = 6\frac{1}{5} - 3\frac{2}{5} = \frac{31}{5} - \frac{17}{5} = \frac{14}{5} = 2\frac{4}{5}$

b. $7\frac{2}{3} - b = 5\frac{1}{3}$ ⟹ [Use whole-part model]

$b = 7\frac{2}{3} - 5\frac{1}{3} = [7-5] + [\frac{2}{3}-\frac{1}{3}] = 2\frac{1}{3}$

$7\frac{2}{3}$	
b	$5\frac{1}{3}$

Learn ② Finding like denominators

Mixed numbers with unlike denominators	Use **LCM** of denominators	Mixed numbers with like denominator

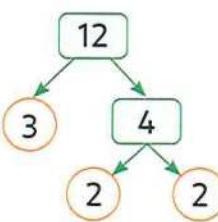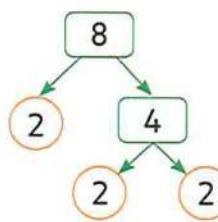Example :

$$2\frac{4}{8} \quad \text{and} \quad 1\frac{9}{12}$$

$$2\frac{12}{24} \quad \text{and} \quad 1\frac{18}{24}$$

8 → 2, 4 → 2, 2

12 → 3, 4 → 2, 2

$8 = 2 \times 2 \times 2$

$12 = 2 \times 2 \quad \times 3$

$LCM = 2 \times 2 \times 2 \times 3 = \boxed{24}$

Note that

It is possible to put the two fractions in the simplest form before finding LCM of the two denominators as the following.
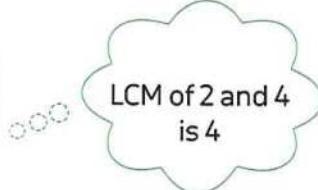
$$2\frac{4}{8} \quad \text{and} \quad 1\frac{9}{12}$$

Simplify

$$2\frac{1}{2} \quad \text{and} \quad 1\frac{3}{4}$$

LCM of 2 and 4 is 4

$$2\frac{2}{4} \quad \text{and} \quad 1\frac{3}{4}$$

From the previous :

The two unlike denominators of fractions $2\frac{4}{8}$ and $1\frac{9}{12}$ can be rewrite with like

denominators in different forms such as : $2\frac{12}{24}$ and $1\frac{18}{24}$ or $2\frac{2}{4}$ and $1\frac{3}{4}$

Example 3

Rewrite the given mixed numbers with like denominators in two different ways.

$1\frac{3}{8}$ and $3\frac{12}{15}$
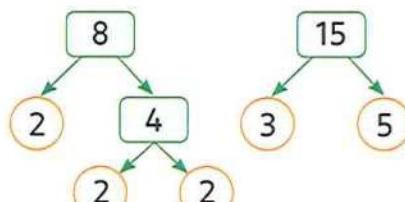
Solution

First way:

$1\frac{3}{8}$ and $3\frac{12}{15}$

$1\frac{45}{120}$ and $3\frac{96}{120}$

8 → 2, 4 → 2, 2
15 → 3, 5

$8 = 2 \times 2 \times 2$
$15 = 3 \times 5$

LCM $= 2 \times 2 \times 2 \times 3 \times 5 = $ 120

Second way:

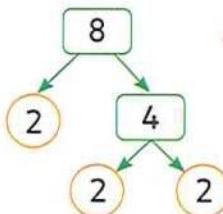$1\frac{3}{8}$ and $3\frac{12}{15}$

Simplify

$1\frac{3}{8}$ and $3\frac{4}{5}$

$1\frac{15}{40}$ and $3\frac{32}{40}$

8 → 2, 4 → 2, 2

$8 = 2 \times 2 \times 2$
$5 = 5$

LCM $= 2 \times 2 \times 2 \times 5 = $ 40

i.e. $1\frac{3}{8}$ and $3\frac{12}{15}$ | Can be rewrite with like denominators as →

$1\frac{45}{120}$ and $3\frac{96}{120}$

or

$1\frac{15}{40}$ and $3\frac{32}{40}$

✔ Check your understanding

Rewrite $3\frac{6}{18}$ and $4\frac{18}{24}$ with like denominators in two different ways.

_____

_____

_____

Learn ③ Estimation with mixed numbers

🔔 Remember

In any fraction :

If the numerator is much less than half the denominator, the fraction is closer to 0	If the numerator is about half the denominator, the fraction is closer to $\frac{1}{2}$	If the numerator is much more than half the denominator, the fraction is closer to 1
Example : each of $\frac{1}{7},\frac{2}{9},\frac{3}{20}$ is closer to 0	Example : each of $\frac{3}{8},\frac{6}{10},\frac{11}{20}$ is closer to $\frac{1}{2}$	Example : each of $\frac{9}{10},\frac{14}{13},\frac{6}{7}$ is closer to 1

From the previous :

▶ If $9\frac{x}{7}$ is a little greater than $9\frac{1}{2}$, then x is estimated as ⬚4 or ⬚5 .

▶ If $4\frac{k}{8}$ is almost 5, then k is estimated as ⬚6 , ⬚7 , ⬚8 , ⬚9 or ⬚10 .

▶ If $8\frac{3}{n}$ is slightly less then $8\frac{1}{2}$, then n is estimated as ⬚7 or ⬚8 .

Note that

Answers may vary

Example 4

Estimate one possible value for x in each of the following.

a. $5\frac{x}{24}$ is slightly greater than $5\frac{1}{2}$

b. $7\frac{8}{x}$ is a little greater than 7

c. $4\frac{x}{9}$ is about $4\frac{3}{4}$

d. $17\frac{20}{x}$ is a little less than 18

Solution 💡

a. 13   b. 100   c. 7   d. 21

54

Example 5

Estimate each sum or difference from the following.

a. $7\frac{4}{5} - 2\frac{1}{6}$

b. $8\frac{2}{3} + 1\frac{5}{6}$

c. $2\frac{1}{5} + 6\frac{11}{21}$

d. $9\frac{6}{7} - 5\frac{4}{9}$

Solution

a. $7\frac{4}{5} - 2\frac{1}{6}$ is estimated as $8 - 2 = 6$

b. $8\frac{2}{3} + 1\frac{5}{6}$ is estimated as $9 + 2 = 7$

c. $2\frac{1}{5} + 6\frac{11}{21}$ is estimated as $2 + 6\frac{1}{2} = 8\frac{1}{2}$

d. $9\frac{6}{7} - 5\frac{4}{9}$ is estimated as $10 - 5\frac{1}{2} = 9\frac{2}{2} - 5\frac{1}{2} = 4\frac{1}{2}$

✓ Check your understanding

1. Estimate one value for n.

   a. $7\frac{3}{n}$ is little less than $7\frac{1}{2}$

   b. $4\frac{n}{19}$ is about 5

2. Estimate.

   a. $3\frac{1}{5} - 1\frac{9}{11}$

   b. $8\frac{7}{8} + 7\frac{1}{6}$

Exercise
5

on lessons 1 to 3

• **Adding and Subtracting Mixed Numbers with Like Denominators**
• **Finding Like Denominators**
• **Estimation with Mixed Numbers**

● REMEMBER ● UNDERSTAND ○ APPLY ❖ PROBLEM SOLVING 📖 From the school book

1. 📖 Complete the chart by rewriting the given values in two other forms.

	Mixed Number	Improper Fraction Equivalent	Mixed Number Equivalent
a.	$3\frac{1}{3}$	$\frac{}{}$	$2\frac{}{}$
b.	$2\frac{5}{8}$	$\frac{}{}$	$1\frac{}{}$
c.	$\frac{}{}$	$\frac{28}{5}$	$3\frac{}{}$
d.	$4\frac{3}{4}$	$\frac{}{}$	$3\frac{}{}$
e.	$\frac{}{}$	$\frac{9}{2}$	$2\frac{}{}$
f.	$\frac{}{}$	$\frac{22}{4}$	$3\frac{}{}$

2. Evaluate each sum or difference. Simplify if possible.

a. 📖 $1\frac{3}{5} + 3\frac{1}{5} = $ ——

b. 📖 $2\frac{5}{6} + 2\frac{3}{6} = $ ——

c. $7\frac{1}{6} + 1\frac{3}{6} = $ ——

d. $4\frac{4}{9} + 1\frac{1}{9} = $ ——

e. 📖 $8\frac{3}{7} - 8\frac{1}{7} = $ ——

f. 📖 $1\frac{2}{3} + 3\frac{2}{3} = $ ——

g. 📖 $3\frac{2}{5} - 1\frac{4}{5} = $ ——

h. 📖 $5\frac{1}{4} - 2\frac{3}{4} = $ ——

i. $2\frac{3}{4} + 5\frac{1}{4} = $ ——

j. $5\frac{2}{7} - 3\frac{4}{7} = $ ——

k. $8\frac{3}{4} + 2\frac{3}{4} = $ ——

l. $4\frac{3}{11} - 1\frac{7}{11} = $ ——

m. 📖 $2\frac{1}{4} + 2\frac{3}{4} = $ ——

n. 📖 $4\frac{5}{6} - 2\frac{1}{6} = $ ——

3. 📖 Choose from the given values to solve each.

$\dfrac{1}{3}$	$\dfrac{2}{3}$	$1\dfrac{1}{3}$	$1\dfrac{2}{3}$	$5\dfrac{1}{4}$	$5\dfrac{2}{4}$	$5\dfrac{3}{4}$
$2\dfrac{2}{5}$	$2\dfrac{3}{5}$	$2\dfrac{4}{5}$	$\dfrac{5}{8}$	$1\dfrac{3}{8}$	$1\dfrac{5}{8}$	$\dfrac{1}{5}$

a. $3\dfrac{1}{5} + b = 5\dfrac{3}{5}$ $b = $ ———

b. $c + 4\dfrac{2}{3} = 5\dfrac{1}{3}$ $c = $ ———

c. $2\dfrac{4}{8} - d = 1\dfrac{1}{8}$ $d = $ ———

d. $f + 1\dfrac{3}{4} = 7\dfrac{1}{4}$ $f = $ ———

e. $g - \dfrac{7}{8} = \dfrac{6}{8}$ $g = $ ———

f. $2\dfrac{2}{3} - h = 1$ $h = $ ———

g. $j + 3\dfrac{3}{4} = 9\dfrac{2}{4}$ $j = $ ———

h. $8\dfrac{1}{5} - k = 5\dfrac{3}{5}$ $k = $ ———

i. $4 - p = 1\dfrac{1}{5}$ $p = $ ———

j. $r + 6\dfrac{5}{8} = 7\dfrac{2}{8}$ $r = $ ———

4. Rewrite the given two mixed numbers with like denominators in two different ways.

a. $3\dfrac{1}{4}$ and $1\dfrac{6}{30}$

• **First way :**

$3\dfrac{1}{4}$ and $1\dfrac{6}{30}$

□ = and = □

4 → 2 , ○

30 → ○ , □ → ○ , ○

$4 = 2 \times$ ———

$30 = $ ———

$LCM = $ ———
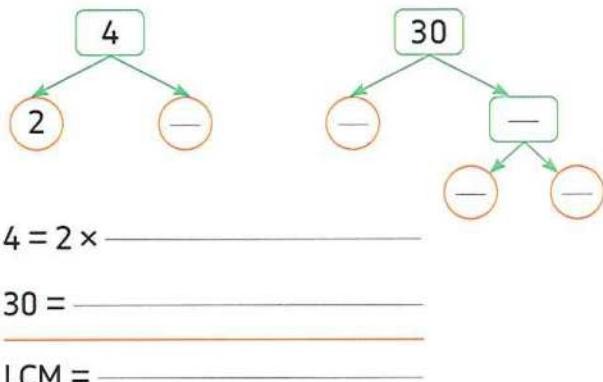
• **Second way :**

b. $3\dfrac{1}{4}$ and $1\dfrac{6}{30}$

$\dfrac{\ —\ }{4}$ and $\dfrac{\ —\ }{5}$ in the simplest form

$\dfrac{\ —\ }{20}$ and $\dfrac{\ —\ }{20}$ LCM of 4 and 5 is 20

5. 📖 Rewrite the given mixed numbers with like denominators in two different ways.

First Rewirte		Second Rewirte

a. $1\frac{3}{4}$ and $1\frac{6}{15}$ A. ——— and ——   B. ——— and ——

b. $3\frac{6}{8}$ and $2\frac{8}{12}$ A. ——— and ——   B. ——— and ——

c. $2\frac{9}{18}$ and $2\frac{14}{24}$ A. ——— and ——   B. ——— and ——

d. $3\frac{12}{16}$ and $1\frac{15}{24}$ A. ——— and ——   B. ——— and ——

e. $10\frac{5}{6}$ and $5\frac{15}{27}$ A. ——— and ——   B. ——— and ——

6. Complete the following table using the like denominators.

	Two mixed numbers	Like denominators	Rewrite in like denominators
a.	$3\frac{50}{100}$, $4\frac{12}{30}$	10	——= , ——=
b.	$5\frac{8}{40}$, $1\frac{9}{15}$	5	——= , ——=
c.	$2\frac{2}{3}$, $8\frac{12}{18}$	3	——= , ——=
d.	$4\frac{15}{25}$, $3\frac{6}{15}$	5	——= , ——=
e.	$1\frac{21}{24}$, $4\frac{25}{40}$	8	——= , ——=

7. Join each fraction and mixed number to its suitable place on the number line.

$$\frac{9}{12} \qquad \frac{3}{8} \qquad 3\frac{8}{9} \qquad 1\frac{3}{7} \qquad 3\frac{2}{10} \qquad 2\frac{1}{12}$$

0   F   C   1   D   2 A   3 E   B   4

8. 📖 Use number sense and estimation to complete the mixed numbers.

a. $7\frac{a}{8}$ is a little greater than $7\frac{1}{2}$ Estimate for a : _____

b. $3\frac{b}{9}$ is almost 4   Estimate for b : _____

c. $10\frac{3}{c}$ is slightly less than $10\frac{1}{2}$ Estimate for c : _____

d. $1\frac{8}{d}$ is nearly $1\frac{1}{2}$ Estimate for d : _____

e. $2\frac{10}{f}$ is slightly greater than $2\frac{1}{2}$ Estimate for f : _____

f. $5\frac{20}{g}$ is a little less than 6   Estimate for g : _____

g. $4\frac{h}{54}$ is slightly greater than $4\frac{1}{2}$ Estimate for h : _____

h. $2\frac{10}{j}$ is a little greater than 2   Estimate for j : _____

i. $3\frac{k}{23}$ is about $3\frac{3}{4}$ Estimate for k : _____

j. $3\frac{p}{29}$ is about $3\frac{3}{4}$ Estimate for p : _____

9. Using estimation to add and subtract. Estimate each sum or difference.

a. 📖 $6\frac{3}{4}-2\frac{1}{5}$ _____   **b.** 📖 $4\frac{2}{3}+3\frac{5}{6}$ _____

c. $5\frac{1}{6}+4\frac{8}{9}$ _____   **d.** $2\frac{4}{9}-\frac{11}{20}$ _____

e. $12\frac{3}{7}+3\frac{5}{11}$ _____   **f.** 📖 $2\frac{1}{5}+3\frac{10}{21}$ _____

g. $10\frac{7}{8}-5\frac{4}{9}$ _____   **h.** 📖 $4\frac{3}{5}-1\frac{7}{12}$ _____

i. 📖 $3\frac{21}{24}-2\frac{1}{3}$ _____   **j.** $6\frac{3}{8}+1\frac{1}{2}$ _____

k. $7\frac{2}{11}-3\frac{12}{100}$ _____   **l.** $1\frac{5}{11}+2\frac{7}{8}$ _____

m. 📖 $9\frac{6}{11}+2\frac{3}{100}$ _____   **n.** 📖 $7\frac{5}{14}-3\frac{19}{34}$ _____

o. $4\frac{1}{10}+5\frac{6}{13}$ _____   **p.** $6\frac{3}{7}-4\frac{2}{75}$ _____

10. 📖 Read the problem. Then, explain how you would regroup quantities to solve the problem.

This summer , Nagi and his brother helped harvest cotton. There were 10 square meters of cotton that needed to be harvested. Nagi and his brother each harvested $3\frac{3}{4}$ m^2 of cotton.

How many square meters of cotton were left ?

---

11. 📖 Fady is writing $\frac{16}{24}$ and $\frac{3}{5}$ with like denominators. He is concerned that the denominator of the new fractions will be very large and that he will make a mistake rewriting the fractions.

Identify the missing values to rewrite each fraction with 120 as the denominator.

1. $\frac{16}{24} = \frac{?}{120}$ 2. $\frac{3}{5} = \frac{?}{120}$

3. Is there a denominator less than 120 that can be used ? Explain your reasoning.

---

12. 📖 **Read the problem. Then, explain one way to rewrite the mixed numbers with like denominators using equivalent fractions.**

Egyptian cotton is popular because the fibers are long, making Egyptian cotton smoother and silkier than other cotton fabrics. Egyptian cotton fibers usually range in length from about 3 to 5 centimeters. There fibers are first spun into thread and then thread is woven into fabric. Warda measured 3 pieces of Egyptian cotton fabric in meters.

$5\frac{16}{20}$ m $3\frac{18}{45}$ m $3\frac{5}{25}$ m

How would you rewrite the mixed numbers with like denominators ?

---

13. 📖 Dalia has $2\frac{1}{2}$ square meters of land on which she will plant cotton or sugarcane. She wants to plant on as much of the land as possible without wasting too much seed.
Dalia has enough cotton seed to cover $2\frac{3}{4}$ m^2 of land. She has enough sugarcane seed to cover $2\frac{3}{8}$ m^2 of land.

Which crop should she plant ? Why ?

Choose the correct answer.

1. If $3\dfrac{2}{a}$ is estimated as 3 , then a can equal ————

    A. 2   **B.** 1   **C.** 4   **D.** 15

2. $4\dfrac{3}{7}+1\dfrac{5}{7}=$ ————

    A. $5\dfrac{1}{7}$ **B.** $6\dfrac{1}{7}$ **C.** $5\dfrac{8}{14}$ **D.** $6\dfrac{2}{7}$

3. $5\dfrac{5}{8}-3\dfrac{2}{8}=$ ————

    A. $8\dfrac{7}{8}$ **B.** $3\dfrac{3}{8}$ **C.** $2\dfrac{1}{4}$ **D.** $2\dfrac{3}{8}$

4. $4\dfrac{3}{5}+k=6\dfrac{2}{5}$, then k = ————

    A. $1\dfrac{4}{5}$ **B.** 11   **C.** $2\dfrac{1}{5}$ **D.** $1\dfrac{3}{5}$

5. Two fractions $2\dfrac{5}{8}$ and $1\dfrac{3}{4}$ with like denominators are ————

    A. $2\dfrac{5}{16}$ and $1\dfrac{3}{16}$ **B.** $1\dfrac{5}{8}$ and $2\dfrac{6}{8}$ **C.** $2\dfrac{5}{8}$ and $1\dfrac{3}{8}$ **D.** $2\dfrac{5}{8}$ and $1\dfrac{6}{8}$

6. $8\dfrac{3}{5}+1\dfrac{1}{12}$ can estimated as ————

    A. 9   **B.** $9\dfrac{1}{2}$ **C.** 10   **D.** $8\dfrac{1}{2}$

7. If $5\dfrac{n}{18}$ is about 5 , then n may be ————

    A. 8   **B.** 17   **C.** 2   **D.** 12

8. $9\dfrac{4}{7}-9\dfrac{1}{7}=$ ————

    A. 0   **B.** $9\dfrac{3}{7}$ **C.** $\dfrac{3}{7}$ **D.** $1\dfrac{2}{7}$

9. $\dfrac{19}{5}$ is equivalent to ————

    A. $3\dfrac{3}{5}$ **B.** $4\dfrac{1}{5}$ **C.** $3\dfrac{5}{5}$ **D.** $3\dfrac{4}{5}$

10. $3\dfrac{4}{7}$ can be regrouped as ————

    A. 3   **B.** 4   **C.** $2\dfrac{11}{7}$ **D.** $2\dfrac{4}{7}$

Adding and Subtracting Mixed Numbers with Unlike Denominators

🔍 Did You Know?!

The average birth weight of a full-term male baby is $3\frac{3}{10}$ kg.

The average of birth weight of a full-term female is $3\frac{2}{10}$ kg.

What is the difference between the two weights?

Lesson No.	Lesson Name	Lesson Objectives
Lessons 4 to 6	Using Models to Add and Subtract Mixed Numbers	• Students will use models to represent addition and subtraction of mixed numbers with unlike denominators.
	Adding and Subtracting Mixed Numbers, Part 1	• Students will add and subtract fractions and mixed numbers with unlike denominators. • Students will use estimation to assess the reasonableness of their answers.
	Adding and Subtracting Mixed Numbers, Part 2	• Students will add and subtract fractions and mixed numbers with unlike denominators.
Lessons 7 & 8	Story Problems with Mixed Numbers	• Students will solve story problems involving addition and subtraction of fractions and mixed numbers.
	More Story Problems with Mixed Numbers	• Students will solve story problems involving addition and subtraction of fractions and mixed numbers.

- **Using Models to Add and Subtract Mixed Numbers**
- **Adding and Subtracting Mixed Numbers, Part1**
- **Adding and Subtracting Mixed Numbers, Part2**

Learn ❶ Using models to add and subtract mixed numbers

To add or subtract two mixed numbers using models

| ❶ Model each mixed number using model area | → | ❷ Divide the two fraction parts into the same number of rectangles | → | ❸ Add or subtract and regroup the result |

Add : $2\frac{2}{3} + 1\frac{1}{2}$

▶ **Step ❶ : Modeling**

▶ **Step ❷ : Dividing**

▶ **Step ❸ : Adding**

$= 4\frac{1}{6}$
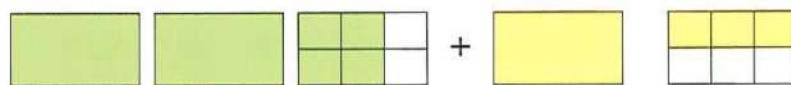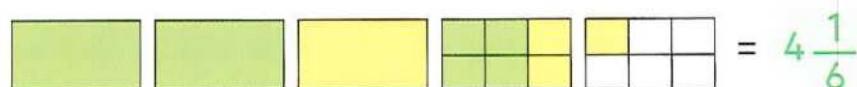
Subtract : $2\frac{2}{3} - 1\frac{1}{2}$

▶ **Step ❶ : Modeling**

▶ **Step ❷ : Dividing**

▶ **Step ❸ : Subtracting**

$= 1\frac{1}{6}$
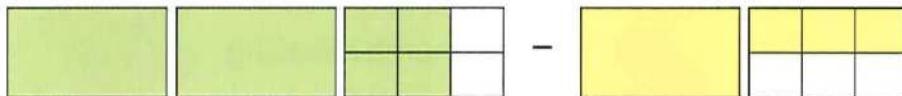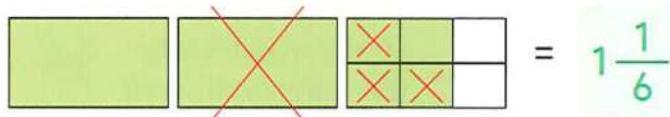
✓ **Check** your understanding

Use an area model to find.

a. $1\frac{4}{5} + 2\frac{1}{2}$

b. $3\frac{3}{8} - 2\frac{3}{4}$

Using number line to subtract mixed numbers

To subtract $5\frac{1}{3} - 2\frac{1}{2}$ using number line

①	②	③
Draw number line	Start at $2\frac{1}{2}$, mark jumps to 3 , 4 , 5 and $5\frac{1}{3}$	Add lengths of the jumps to find the difference

$2\frac{1}{2}$ subtrahend

$\frac{1}{2}$ 1   1 $\frac{1}{3}$

Length of the jump

2   3   4   5   6
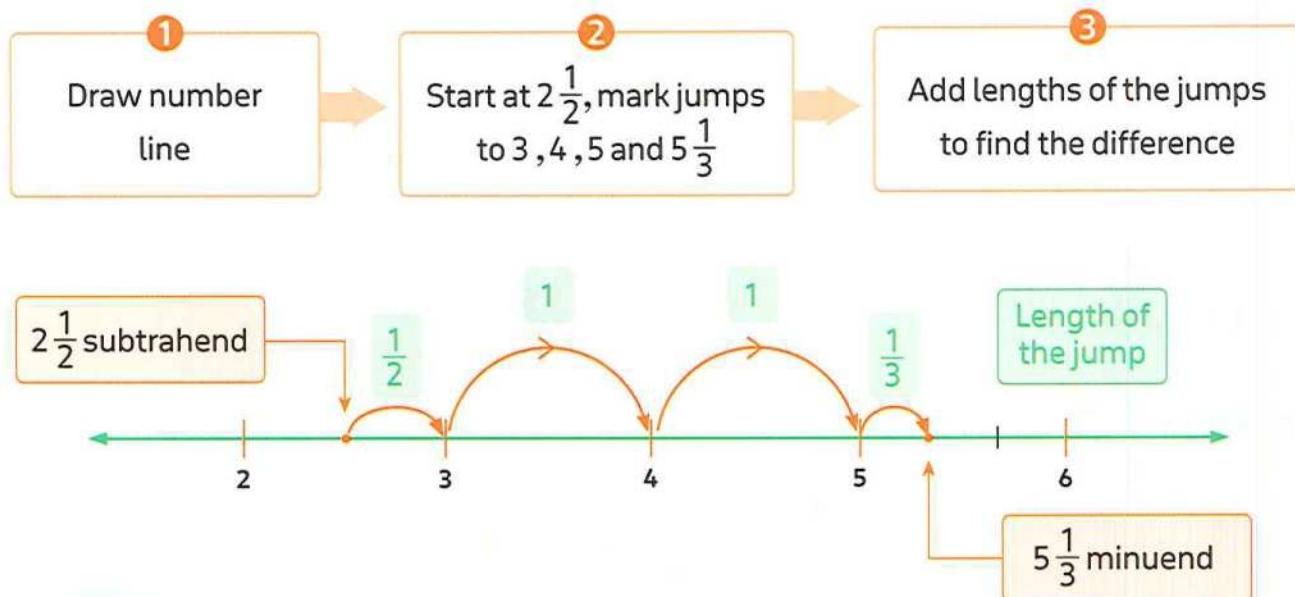
$5\frac{1}{3}$ minuend

The difference $= \frac{1}{2} + 1 + 1 + \frac{1}{3}$

$= \frac{3}{6} + 2 + \frac{2}{6} = 2\frac{5}{6}$

✓ Check your understanding

Use number line to find.

a. $4\frac{3}{4} - 2\frac{5}{6}$

b. $8\frac{1}{5} - 6\frac{3}{4}$

Learn ② Adding and subtracting mixed numbers

There are two methods to add or subtract two mixed numbers with unlike denominators

① By rewriting the mixed numbers as improper fractions.

② By decomposing the mixed numbers.

Example 1

Find. ① $7\frac{3}{5} + 2\frac{1}{4}$ ② $4\frac{1}{3} - 2\frac{5}{6}$

Solution

①
Using improper fractions	Using decomposing the mixed numbers
$7\frac{3}{5} + 2\frac{1}{4}$	$7\frac{3}{5} + 2\frac{1}{4}$
$= \frac{38}{5} + \frac{9}{4}$	$= (7+2) + (\frac{3}{5}+\frac{1}{4})$
$= \frac{152}{20} + \frac{45}{20}$	$= 9 + (\frac{12}{20} + \frac{5}{20})$
$= \frac{197}{20} = 9\frac{17}{20}$	$= 9 + \frac{17}{20} = 9\frac{17}{20}$

②
Using improper fractions	Using decomposing the mixed number
$4\frac{1}{3} - 2\frac{5}{6}$	$4\frac{1}{3} - 2\frac{5}{6}$
$= \frac{13}{3} - \frac{17}{6}$	$= 3\frac{4}{3} - 2\frac{5}{6}$
$= \frac{26}{6} - \frac{17}{6}$	$= (3-2) + (\frac{4}{3} - \frac{5}{6})$
$= \frac{9}{6} = \frac{3}{2} = 1\frac{1}{2}$	$= 1 + (\frac{8}{6} - \frac{5}{6})$
	$= 1 + \frac{3}{6} = 1\frac{1}{2}$

Notice
Regroup when the fraction of minuend is less than the fraction of subtrahend.

✓ **Check** your understanding

Evaluate each sum or difference.

a. $12\frac{3}{4} + 3\frac{6}{12}$ | b. $7\frac{5}{14} - 3\frac{2}{7}$ | c. $5\frac{4}{5} + 4\frac{5}{6}$ | d. $11\frac{2}{9} - 3\frac{3}{4}$

Learn ③ Adding and subtracting mixed numbers by adjusting the mixed numbers

You can use "Give and take strategy" to make addition and subtraction easier (for example using compatible numbers, making 10 and so on) as the following.

• $4\frac{7}{10} + 3\frac{2}{5}$

$= 4\frac{7}{10} + \frac{3}{10} + 3\frac{2}{5} - \frac{3}{10}$ ⟵ Give and take

$= 5 + 3 + \frac{4}{10} - \frac{3}{10} = 8\frac{1}{10}$

• $5\frac{3}{7} - 2\frac{4}{7}$

$= (5\frac{3}{7} + \frac{3}{7}) - (2\frac{4}{7} + \frac{3}{7})$

$= 5\frac{6}{7} - 3 = 2\frac{6}{7}$

✓ **Check** your understanding

Solve each equation by adjusting the mixed numbers.

a. $1\frac{3}{7} + 3\frac{2}{7} = 2 + \underline{\hspace{2cm}}$

b. $4\frac{3}{8} + \frac{1}{4} = 5 + \underline{\hspace{2cm}}$

c. $5\frac{2}{7} - 2\frac{4}{7} = \underline{\hspace{2cm}} - 3$

d. $5\frac{1}{8} - 2\frac{1}{4} = \underline{\hspace{2cm}} - 3$

Example 2

Find the missing number using any strategy, simplify if possible.

a. $k + 3\frac{1}{4} = 5\frac{5}{6}$

b. $9\frac{9}{20} - c = 4\frac{3}{20}$

c. $a + 7\frac{3}{5} = 10\frac{7}{10}$

d. $h - 4\frac{7}{8} = 4\frac{37}{40}$

Solution

a. $k + 3\frac{1}{4} = 5\frac{5}{6}$

$k = 5\frac{5}{6} - 3\frac{1}{4}$

$k = [5 - 3] + [\frac{5}{6} - \frac{1}{4}]$

$k = 2 + [\frac{10}{12} - \frac{3}{12}]$

$k = 2 + \frac{7}{12} = 2\frac{7}{12}$

b. $9\frac{9}{20} - c = 4\frac{3}{20}$

$c = 9\frac{9}{20} - 4\frac{3}{20}$

$c = 5\frac{6}{20}$

$c = 5\frac{3}{10}$

$9\frac{9}{20}$	
c	$4\frac{3}{20}$

c. $a + 7\frac{3}{5} = 10\frac{7}{10}$

$a = 10\frac{7}{10} - 7\frac{3}{5}$

$a = [10 - 7] + [\frac{7}{10} - \frac{3}{5}]$

$a = 3 + [\frac{7}{10} - \frac{6}{10}]$

$a = 3 + \frac{1}{10}$

$a = 3\frac{1}{10}$

d. $h - 4\frac{7}{8} = 4\frac{37}{40}$

$h = 4\frac{37}{40} + 4\frac{7}{8}$

$h = [4 + 4] + [\frac{37}{40} + \frac{7}{8}]$

$h = 8 + [\frac{37}{40} + \frac{35}{40}]$

$h = 8 + \frac{72}{40}$

$h = 8 + 1\frac{32}{40}$

$h = 9\frac{32}{40}$

$h = 9\frac{4}{5}$

✅ **Check** your understanding

Find the missing number using any strategy.

a. $X + 1\frac{3}{5} = 4\frac{1}{2}$

b. $y - 2\frac{2}{7} = 1\frac{3}{8}$

● REMEMBER   ● UNDERSTAND   ● APPLY   •• PROBLEM SOLVING   📖 From the school book

1. Use area models to add.

a. $1\frac{1}{2} + 2\frac{1}{3} = $ _____

b. $3\frac{2}{5} + 1\frac{7}{10} = $ _____

c. $2\frac{3}{4} + 1\frac{2}{3} = $ _____

d. $1\frac{4}{7} + 2\frac{1}{2} = $ _____

2. 📖 Use an area model to find each sum.

a. $2\frac{2}{5} + 1\frac{1}{2} = $ _____

b. $3\frac{2}{3} + 2\frac{4}{5} = $ _____

c. $4\frac{2}{3} + 2\frac{3}{4} = $ _____

d. $2\frac{3}{8} + 5\frac{3}{4} =$ _____

e. $2\frac{5}{12} + 1\frac{1}{6} =$ _____

f. $2\frac{3}{4} + 1\frac{4}{10} =$ _____

---

3. Use area models to subtract.

a. $2\frac{5}{6} - 1\frac{2}{3} =$ _____

			–		

b. $1\frac{3}{4} - \frac{1}{2} =$ _____

		–	

c. $2\frac{3}{5} - 1\frac{1}{3} =$ _____

			–		

d. $3\frac{1}{2} - 2\frac{2}{3} =$ _____

				–			

---

4. 📖 Use an area model to find each difference.

a. $3\frac{1}{2} - 1\frac{2}{5} =$ _____

b. $4\frac{1}{6} - 2\frac{5}{12} = $ _____

c. $1\frac{2}{3} - \frac{1}{2} = $ _____

d. $4\frac{5}{8} - 3\frac{1}{6} = $ _____

5. Use a number line to find the difference.

a. $6\frac{1}{5} - 4\frac{3}{4} = $ _____
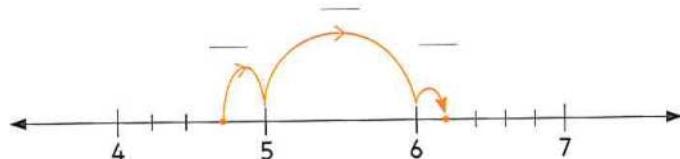
b. $9\frac{2}{3} - 6\frac{1}{2} = $ _____
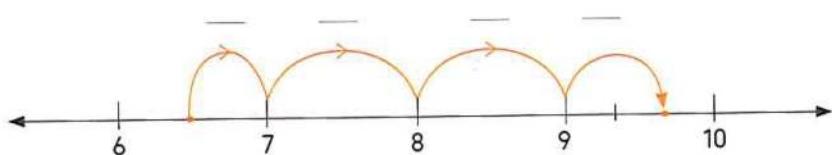
c. $7\frac{5}{6} - 4\frac{1}{4} = $ _____
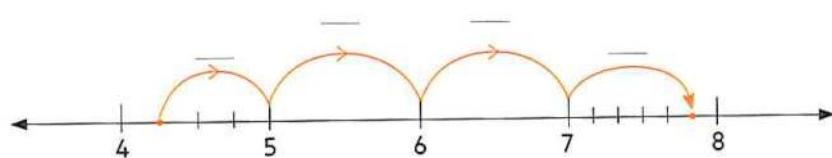
d. $8\frac{3}{4} - 5\frac{1}{3} = $ _____
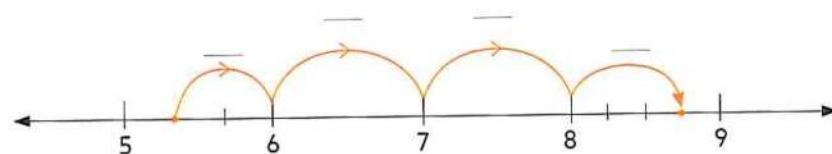
6. 📖 Use a number line to find the difference.

a. $5\frac{1}{4} - 3\frac{1}{6} = $ _____

b. $6\frac{1}{3} - 3\frac{4}{5} =$ ———

c. $2\frac{7}{8} - 1\frac{1}{2} =$ ———

d. $9\frac{1}{4} - 8\frac{3}{5} =$ ———

7. Rewrite the mixed numbers in two different ways.

a. 📖 $4\frac{3}{5} =$ ——— $=$ ———

b. 📖 $4\frac{1}{4} =$ ——— $=$ ———

c. $6\frac{2}{3} =$ ——— $=$ ———

d. 📖 $3\frac{7}{9} =$ ——— $=$ ———

e. $7\frac{4}{5} =$ ——— $=$ ———

f. 📖 $3\frac{5}{6} =$ ——— $=$ ———

g. $9\frac{3}{4} =$ ——— $=$ ———

h. 📖 $5\frac{1}{7} =$ ——— $=$ ———

8. 📖 Estimate each sum or difference, and then evaluate. Simplify if possible.

a. $4\frac{3}{5} - 2\frac{1}{3}$ Estimate: ——— Evaluate: ———

b. $8\frac{1}{2} - 2\frac{3}{7}$ Estimate: ——— Evaluate: ———

c. $7\frac{1}{2} - 2\frac{7}{8}$ Estimate: ——— Evaluate: ———

d. $5\frac{7}{9} + 2\frac{2}{3}$ Estimate: ——— Evaluate: ———

e. $4\frac{1}{4} - 2\frac{5}{6}$ Estimate: ——— Evaluate: ———

f. $3\frac{4}{5} + 2\frac{2}{3}$ Estimate: ——— Evaluate: ———

g. $9\frac{1}{6} - 3\frac{1}{3}$ Estimate: ——— Evaluate: ———

h. $1\frac{2}{3} - 1\frac{3}{5}$ Estimate :——   Evaluate :——

i. $4\frac{3}{4} + 9\frac{5}{12}$ Estimate :——   Evaluate :——

j. $2\frac{1}{4} + 1\frac{11}{16}$ Estimate :——   Evaluate :——

k. $5\frac{7}{10} + 8\frac{3}{4}$ Estimate :——   Evaluate :——

l. $9\frac{1}{10} - 5\frac{7}{12}$ Estimate :——   Evaluate :——

m. $5\frac{1}{3} - 2\frac{4}{5}$ Estimate :——   Evaluate :——

n. $1\frac{2}{3} - 1\frac{15}{24}$ Estimate :——   Evaluate :——

---

9. **Find the result in the simplest form.**

a. $3\frac{1}{2} + 2\frac{1}{4}$

b. $3\frac{1}{4} + 7\frac{1}{3}$

c. $4\frac{1}{7} + 2\frac{1}{2}$

d. $6\frac{1}{6} + 7\frac{1}{7}$

e. $9\frac{2}{3} + 8\frac{1}{5}$

f. $6\frac{4}{5} + 4\frac{2}{3}$

g. $2\frac{5}{6} + \frac{8}{9}$

h. $2\frac{1}{2} + \frac{4}{5}$

---

10. **Find the result in the simplest form.**

a. $4\frac{2}{3} - 2\frac{1}{4}$

b. $3\frac{1}{5} - 1\frac{1}{6}$

c. $10\frac{1}{2} - 5\frac{1}{3}$

d. $9\frac{3}{7} - 4\frac{1}{6}$

e. $8\frac{11}{12} - 7\frac{3}{4}$

f. $10\frac{1}{4} - 3\frac{1}{12}$

g. $5\frac{5}{8} - 1\frac{1}{3}$

h. $9\frac{1}{6} - 4\frac{4}{9}$

i. $4\frac{1}{2} - \frac{1}{4}$

j. $7 - \frac{1}{7}$

k. $1\frac{1}{2} - \frac{3}{4}$

l. 📖 $1\frac{4}{7} - \frac{10}{21}$

---

11. **Complete the missing number.**

a. $2\frac{3}{5} + \underline{\quad} = 3\frac{1}{2}$

b. $\underline{\quad} + 1\frac{5}{7} = 3\frac{5}{14}$

c. $6\frac{2}{3} - \underline{\quad} = 4\frac{1}{2}$

d. $\underline{\quad} - 4\frac{3}{4} = 2\frac{3}{5}$

e. $5\frac{2}{5} - \underline{\quad} = 3\frac{1}{3}$

f. $7\frac{3}{8} + \underline{\quad} = 10\frac{1}{4}$

12. 📖 Solve each equation by adjusting the mixed numbers.

a. $3\frac{7}{8} + \frac{1}{4} = 4 +$ _____

c. $7\frac{5}{7} - 5\frac{6}{7} =$ _____ $- 6$

b. $1\frac{5}{6} + 3\frac{1}{3} = 2 +$ _____

d. $6\frac{1}{8} - 3\frac{3}{4} =$ _____ $- 4$

13. 📖 Find the missing number using any strategy. Simplify if possible.

a. $a + 5\frac{5}{6} = 9\frac{1}{12}$, $a =$ _____

b. $8\frac{7}{10} - b = 4\frac{9}{20}$, $b =$ _____

c. $9\frac{5}{20} - c = 4\frac{19}{20}$, $c =$ _____

d. $6\frac{7}{15} + d = 13\frac{3}{10}$, $d =$ _____

e. $f + 9\frac{1}{4} = 12\frac{15}{16}$, $f =$ _____

f. $g - 1\frac{3}{4} = 7\frac{3}{44}$, $g =$ _____

g. $4\frac{12}{18} + h = 11$, $h =$ _____

h. $j - 4\frac{7}{8} = 4\frac{37}{40}$, $j =$ _____
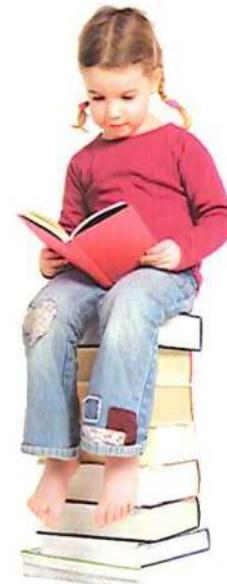
14. 📖 Read the problem and analyze the work submitted by one student.

Wael collected $4\frac{1}{4}$ kilograms of dates.

He gave $2\frac{3}{5}$ kg to a friend.

He wants to know how many

kilograms are left.

Is Wael's response correct ? Explain why or why not.

Wael's work :

$$4\frac{1}{4} \qquad 4\frac{5}{20}$$
$$-2\frac{3}{5} \qquad -2\frac{12}{20}$$
$$\overline{\qquad\qquad 2\frac{7}{20}}$$

15. 📖 Heba and her neighbour, Ezz, enjoy having flowerpots in their yards. Heba's pot of cornflowers has a mass of $3\frac{1}{4}$ kilograms and her pot of poppies has a mass of $1\frac{9}{10}$ kg. Ezz's pot of cornflowers has a mass of $3\frac{1}{2}$ kg and her pot of poppies has a mass of $1\frac{3}{4}$ kg. Whose pots have a greater mass ? By how much ?

A student wrote this solution to the problem about Heba and Ezz. Is the student's work correct ? Explain why or why not.

Heba's pots have a mass of $4\frac{10}{14}$ kg and Ezz's pots have a mass of $4\frac{4}{6}$ kg. Heba's pots have a greater mass by $\frac{6}{8}$ kg.

Choose the correct answer.

1. $5\frac{1}{2} + 3\frac{1}{5} = $ _____

    A. $8\frac{2}{7}$ B. $8\frac{7}{10}$

    C. $8\frac{1}{2}$ D. $8\frac{2}{5}$

2. $1\frac{4}{5} - 1\frac{1}{20} = $ _____

    A. $\frac{7}{20}$ B. $\frac{4}{3}$

    C. $\frac{3}{4}$ D. $1\frac{1}{5}$

3. The number line is used to solve the problem _____
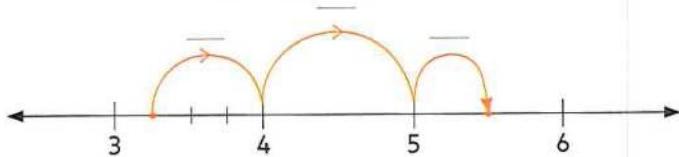
    A. $3\frac{1}{4} + 5\frac{1}{2}$ B. $3\frac{1}{4} - 2\frac{1}{2}$ C. $5\frac{1}{2} - 3\frac{1}{4}$ D. $5\frac{1}{4} + 3\frac{1}{2}$

4. $2\frac{1}{3} + 1\frac{2}{5}$ can be rewrite as _____

    A. $\frac{6}{3} + \frac{5}{5}$ B. $\frac{7}{3} + \frac{5}{7}$

    C. $(2+1) + (\frac{1}{3} + \frac{2}{5})$ D. $3\frac{1}{2} + 5\frac{1}{2}$

5. $4\frac{2}{3} + 1\frac{2}{5} = 5 + 1\frac{2}{5} - $ _____

    A. $\frac{2}{3}$ B. $\frac{2}{5}$

    C. $\frac{3}{5}$ D. $\frac{1}{3}$

6. $7\frac{3}{4} - 3\frac{5}{6} = 7 + \frac{3}{4} + $ _____ $- 4$

    A. $\frac{1}{6}$ B. $\frac{5}{6}$

    C. $\frac{3}{4}$ D. $\frac{1}{4}$

7. $X + 4\frac{1}{4} = 5\frac{1}{2}$, then $X = $ _____

    A. $\frac{1}{2}$ B. $\frac{1}{4}$

    C. $1\frac{1}{2}$ D. $1\frac{1}{4}$

8. $3\frac{3}{8} - 2\frac{1}{4} = $ _____

    A. $1\frac{1}{8}$ B. $1\frac{1}{4}$

    C. $2\frac{1}{4}$ D. $\frac{1}{8}$

9. Which of the following is incorrect ?

    A. $3\frac{3}{4} = 2\frac{7}{4}$ B. $2\frac{5}{8} = \frac{21}{8}$

    C. $\frac{5}{3} = 1\frac{2}{3}$ D. $1\frac{3}{4} - 1\frac{1}{2} = 1\frac{1}{4}$

10. Which of the following is correct ?

    A. $1\frac{1}{2} + 2\frac{3}{4} = (1 + 2) - (\frac{1}{2} + \frac{3}{4})$ B. $7\frac{3}{5} = 6\frac{4}{5}$

    C. $5\frac{1}{3} - 2\frac{2}{3} = 4\frac{4}{3} - 2\frac{2}{3}$ D. $\frac{2}{3} + \frac{1}{4} = \frac{3}{7}$

• Story Problems with Mixed Numbers
• More Story Problems with Mixed Numbers

Learn ① Fraction of units of time

🔔 Remember

| one year = 12 months | one hour = 60 minutes |
| one day = 24 hours | one minute = 60 seconds |

How many months are there in fraction of year?

• Write equivalent fraction of denominator 12 to the given fraction, then the new numerator is the answer.

• $\dfrac{1}{2}$ year = $\dfrac{6}{12}$ year = 6 months

• $\dfrac{2}{3}$ year = $\dfrac{8}{12}$ year = 8 months

How many hours are there in fraction of day?

• Write equivalent fraction of denominator 24 to the given fraction, then the new numerator is the answer.

• $\dfrac{1}{4}$ day = $\dfrac{6}{24}$ day = 6 hours

• $\dfrac{3}{8}$ day = $\dfrac{9}{24}$ day = 9 hours

How many minutes are there in fraction of hour?

• Write equivalent fraction of denominator 60 to the given fraction, then the new numerator is the answer.

• $\dfrac{1}{3}$ hour = $\dfrac{20}{60}$ hour = 20 minutes

• $\dfrac{3}{4}$ hour = $\dfrac{45}{60}$ hour = 45 minutes

How many seconds are there in fraction of minute?

• Write equivalent fraction of denominator 60 to the given fraction, then the new numerator is the answer.

• $\dfrac{3}{10}$ minute = $\dfrac{18}{60}$ minute = 18 seconds

• $\dfrac{5}{6}$ minute = $\dfrac{50}{60}$ minute = 50 seconds

🔔 **Remember**

$$\text{minutes} \xrightarrow{\div 60} \text{hours} \xrightarrow{\times 60}$$

$$\text{seconds} \xrightarrow{\div 60} \text{minutes} \xrightarrow{\times 60}$$

$$\text{hours} \xrightarrow{\div 24} \text{days} \xrightarrow{\times 24}$$

$$\text{months} \xrightarrow{\div 12} \text{year} \xrightarrow{\times 12}$$
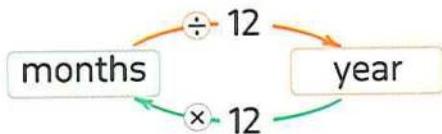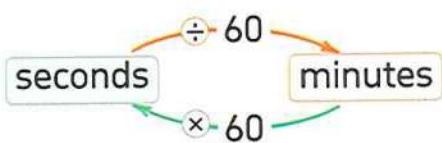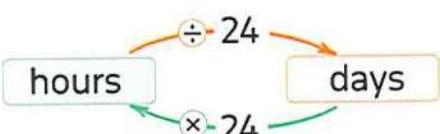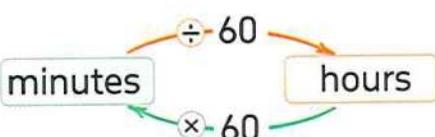
Example :

$$\boxed{\text{80 minutes}} = (80 \div 60) \text{ hours} = \frac{80}{60} \text{ hours} = 1\frac{1}{3} \text{ hour}$$

$$\boxed{\text{36 hours}} = (36 \div 24) \text{ day} = \frac{36}{24} \text{ day} = 1\frac{1}{2} \text{ day}$$

$$\boxed{\text{4 hours}} = (4 \times 60) \text{ minutes} = 240 \text{ minutes}$$

$$\boxed{\text{5 years}} = (5 \times 12) \text{ months} = 60 \text{ months}$$

Example 1

Find a and b in each of the following.

a. $3\frac{1}{4}$ hours = a hours and b minutes

b. $5\frac{1}{3}$ days = a days and b hours

c. 100 seconds = a minutes

Solution 💡

a. $3\frac{1}{4}$ hours = 3 hours and $\frac{15}{60}$ hour

   = 3 hours and 15 minutes $\boxed{a = 3}$, $\boxed{b = 15}$

b. $5\frac{1}{3}$ days = 5 days and $\frac{8}{24}$ day

   = 5 days and 8 hour $\boxed{a = 5}$, $\boxed{b = 8}$

c. 100 seconds = $\frac{100}{60}$ minutes = $1\frac{2}{3}$ minute

Example 2

Samer studied Math for $1\frac{1}{3}$ hour and science for 90 minutes.

How long is the studying time ? Give your answer both as a mixed number and in hours and minutes.

Solution 💡

Time of studying science = 90 minutes = $\frac{90}{60}$ hours

$$= 1\frac{1}{2} \text{ hours}$$

The total studying time = $1\frac{1}{3} + 1\frac{1}{2} = (1+1) + (\frac{1}{3} + \frac{1}{2})$

$$= 2 + (\frac{2}{6} + \frac{3}{6}) = 2\frac{5}{6} \text{ hours}$$

$$= 2 \text{ hours and } \frac{50}{60} \text{ hours}$$

$$= 2 \text{ hours and 50 minutes}$$

✓ **Check** **your understanding**

Complete.

a. $5\frac{2}{3}$ minutes = ——— minutes and ——— seconds

b. $6\frac{3}{5}$ hours = ——— hours and ——— minutes

c. $3\frac{1}{2}$ years = ——— years and ——— months

d. 75 seconds = ——— minute

Learn ② More story problems with mixed numbers

Nader is painting a wall. What part is paint and what is left in each of the following ?

Painted : $\frac{1}{4}$ of the wall

Left : $\frac{3}{4}$ of the wall

Painted : $\frac{19}{36}$ of the wall

Left : $\frac{17}{36}$ of the wall
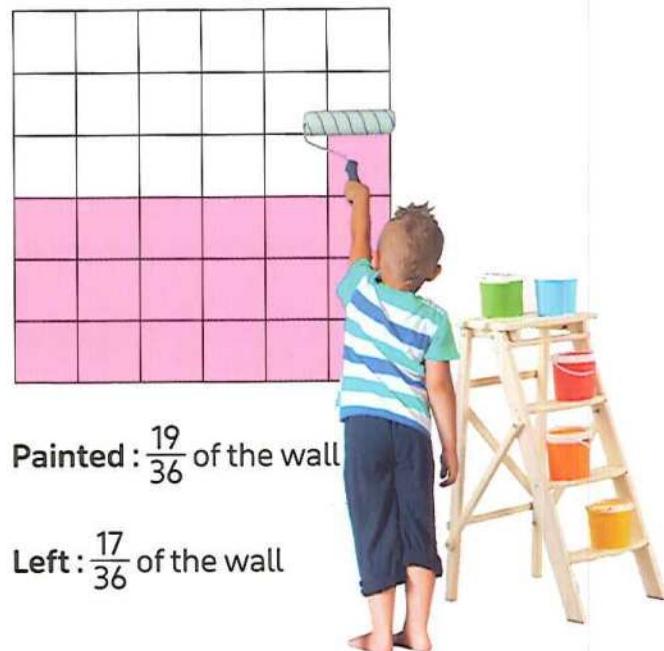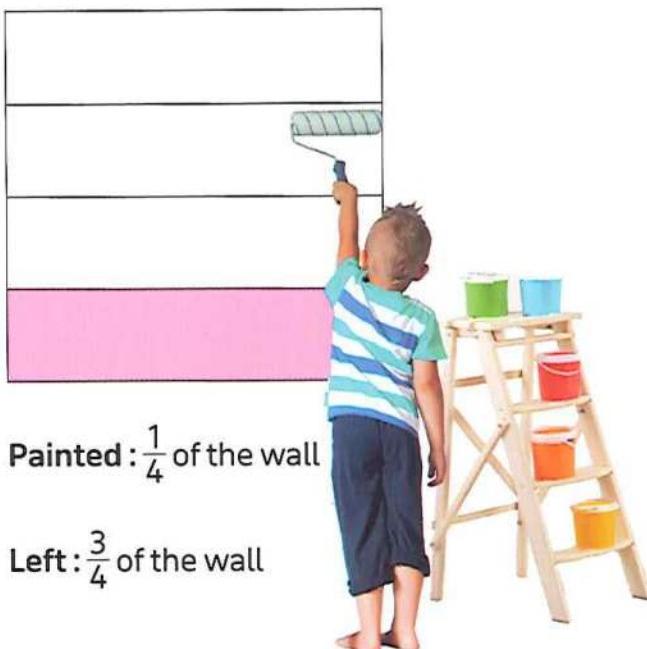
Example 3

Sally bought 4 identical tarts for her birthday party , she cut each tart differently. After the party was over, she noticed there was some pieces left in each tart. There was left $\frac{3}{8}$ of first tart, $\frac{5}{12}$ of second tart, $\frac{5}{24}$ of third tart and $\frac{1}{3}$ of the fourth tart.

a. How much tart was eaten at the party ?

b. Which tart had least left part ?

c. Can the remaining pieces form a whole tart ? Why ?

Solution 💡

1ˢᵗ tart	2ⁿᵈ tart	3ʳᵈ tart	4ᵗʰ tart
left : $\frac{3}{8}$	left : $\frac{5}{12}$	left : $\frac{5}{24}$	left : $\frac{1}{3}$
eaten : $\frac{5}{8}$	eaten : $\frac{7}{12}$	eaten : $\frac{19}{24}$	eaten : $\frac{2}{3}$

a. The eaten tarts $= \frac{5}{8} + \frac{7}{12} + \frac{9}{24} + \frac{2}{3}$

$$= \frac{15}{24} + \frac{14}{24} + \frac{19}{24} + \frac{16}{24} = \frac{64}{24} = 2\frac{16}{24} = 2\frac{2}{3}$$

b. The left parts respectively $\boxed{\frac{3}{8}}$, $\boxed{\frac{5}{12}}$, $\boxed{\frac{5}{24}}$, $\boxed{\frac{1}{3}}$
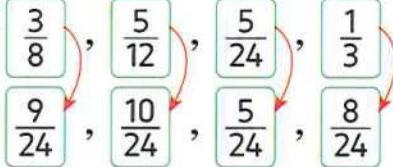
$\boxed{\frac{9}{24}}$, $\boxed{\frac{10}{24}}$, $\boxed{\frac{5}{24}}$, $\boxed{\frac{8}{24}}$

, then the 3rd tart has the least fraction left.

c. Remaining parts can't form whole tart because

$$\frac{9}{24} + \frac{10}{24} + \frac{5}{24} + \frac{8}{24} = \frac{32}{24} = 1\frac{8}{24} = 1\frac{1}{3} \text{ (mixed number)}$$

✅ **Check** your understanding

Zeiad walked $1\frac{3}{4}$ km, Ahmed walked $\frac{1}{5}$ km more than Zeiad and Ramy walked $\frac{3}{10}$ km less than Ahmed.

How many km Ramy walked ?

_____

_____

_____

_____

_____

- **Story Problems with Mixed Numbers**
- **More Story Problems with Mixed Numbers**

● REMEMBER   ● UNDERSTAND   ○ APPLY   ● PROBLEM SOLVING   📖 From the school book

1. **Complete.**

a. $\frac{3}{4}$ hour = ——— minutes

b. $\frac{2}{3}$ minute = ——— seconds

c. $\frac{1}{6}$ day = ——— hours

d. $\frac{4}{5}$ hour = ——— minutes

e. $\frac{3}{4}$ year = ——— months

f. $2\frac{1}{3}$ hours = ——— hours and ——— minutes

g. 📖 $7\frac{1}{10}$ minutes = ——— minutes and ——— seconds

h. $2\frac{3}{5}$ minutes = ——— minutes and ——— seconds

i. 📖 $4\frac{3}{4}$ hours = ——— hours and ——— minutes

j. 📖 $6\frac{1}{2}$ years = ——— years and ——— months

k. $1\frac{1}{2}$ year = [——— + ———] months = ——— months

l. 📖 $2\frac{1}{6}$ hours = [——— + ———] minutes = ——— minutes

m. 30 months = ——— year

n. 📖 80 minutes = ——— hour

o. 150 seconds = ——— minutes
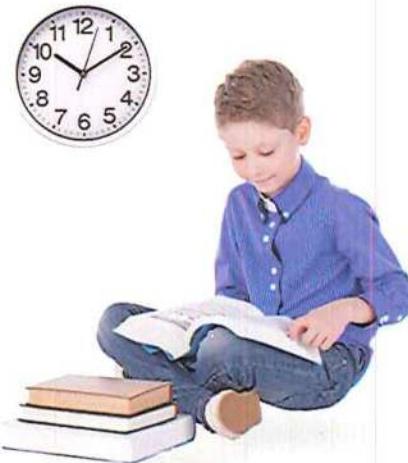
2. Rasha took $2\frac{1}{3}$ hours to paint a table and $1\frac{3}{4}$ hour to paint a chair.
   How much time did she take in all ?

   _____

   _____

3. Karim walked $2\frac{3}{5}$ km and Sameh walked $1\frac{2}{3}$ km more.
   What distance that Sameh walked ?

   _____

   _____

4. Farida bought $2\frac{1}{2}$ kg of tomato, $1\frac{3}{8}$ kg of onion and $5\frac{1}{4}$ kg of potatoes.
How much vegetables did she buy ?

_____

_____

_____

5. A frog took three jumps. The first jump was $\frac{2}{3}$ m long, the second jump was $\frac{1}{5}$ m longer the first and the third jump was $\frac{1}{10}$ m shorter than the second jump.
How long was the third jump ?

_____

_____

6. 📖 Habiba is planting three plume thistle plants. It took her $\frac{5}{6}$ minute to plant the first one. The second plant took $\frac{1}{12}$ min longer to plant than the first one. The third plant took $\frac{1}{10}$ less time to plant than the second one.
How long did it take to plant the third plume thistle ?

_____

_____

_____

7. 📖 On Monday, Afaf spent $5\frac{2}{3}$ hours researching papyrus plants for her presentation. The next day, she spent $\frac{11}{12}$ of an hour less putting her presentation together. Over both days, **how many hours did Afaf spend on her presentation ?**

_____

_____

_____

8. Rania walked $3\frac{3}{4}$ km on Monday, $4\frac{1}{3}$ km on Tuesday and $2\frac{7}{12}$ km on Wednesday.
What distance did she walk in all ?

_____

_____

9. A vessel contains $1\frac{1}{2}$ liter of milk. Ahmed drinks $\frac{1}{4}$ liter of milk and Sara drinks $\frac{1}{2}$ liter of milk. **How much of milk is left in the vessel ?**

_____

_____

10. 📖 Abeer is mixing juice for a celebration. She mixes $5\frac{3}{4}$ liters of fruit juice concentrate with $1\frac{1}{2}$ L more water than fruit juice concentrate. She needs 12 L of the mixture for the celebration. **Does she have enough ? Why or why not ? Explain ?**

_____

_____

_____

11. Youssef thought the plane journey would take $2\frac{1}{5}$ hr but the actual journey took 15 minutes longer. **How long did the actual journey take ?**

a. Write your answer in hours only.

_____

_____

b. Write your answer in hours and minutes.

_____

c. Write your answer in minutes only.

_____

12. Nana took $3\frac{2}{3}$ hours to paint a portrait but she has done it in 30 minutes earlier. **How long did she take to paint the portrait ?**

a. Write your answer in hours only.

_____

b. Write your answer in hours and minutes.

_____

c. Write your answer in minutes only.

_____

13. 📖 A ship traveling up the Nile takes $6\frac{1}{6}$ hours to reach its destination. On the way back, the current helps push the ship along, so it takes 30 fewer minutes for the return trip.

How long is the ship's trip up and down the Nile ?

Give your answer both as a mixed number and in hours and minutes.

_____

_____

_____

14. 📖 Ola baked 4 identical basbousa pans for a celebration. Knowing that some guests like basbousa more than others, she cut each basbousa differently. When the celebration was over, she noticed there was some basbousa left in each pan. There was $\frac{4}{15}$ left in one pan, and $\frac{1}{6}$ remained in another. Another pan had $\frac{5}{12}$ remaining, and $\frac{3}{10}$ was uneaten in the last.

Ola wondered how much basbousa in total was eaten at the celebration.

a. How much basbousa was eaten at the celebration ?

_____

_____

b. Which of the four pans had the least basbousa left ? How do you know ?

_____

c. Ola wants to put the remaining basbousa in one pan. Will it fit ? Why or why not ?

_____

15. 📖 Think about the whole numbers and the denominators in the given expression.

$$3\frac{1}{8} + 2\frac{1}{3}$$

Write a story problem that is reasonable for this pair of mixed numbers.

Solve your problem.

_____

_____

_____

16. 📖 Write an equation using at least three numbers that has $2\frac{1}{20}$ as a solution.

Use both addition and subtraction in your equation and include at least one mixed number.

_____

_____

84

Unit Eight Assessment

1. Choose the correct answer.

a. $2\frac{3}{5} + 1\frac{4}{5} = $ _____

- **A.** $3\frac{7}{10}$
- **B.** $4\frac{2}{5}$
- **C.** $1\frac{1}{5}$
- **D.** $2\frac{7}{5}$

b. $5\frac{2}{7} + k = 6\frac{5}{7}$, then $k = $ _____

- **A.** $11\frac{7}{7}$
- **B.** $1\frac{3}{7}$
- **C.** $4\frac{3}{7}$
- **D.** $5\frac{1}{7}$

c. If $4\frac{X}{22}$ is slightly greater than $4\frac{1}{2}$, then X can be _____

- **A.** 10
- **B.** 21
- **C.** 5
- **D.** 12

d. Two fractions $3\frac{2}{3}$ and $5\frac{1}{6}$ with like denominators are _____

- **A.** $3\frac{2}{3}$ and $5\frac{1}{6}$
- **B.** $\frac{11}{3}$ and $\frac{31}{3}$
- **C.** $3\frac{4}{6}$ and $5\frac{1}{6}$
- **D.** $3\frac{2}{3}$ and $5\frac{2}{6}$

e. $2\frac{3}{5} + $ _____ $= 3\frac{1}{4}$

- **A.** $\frac{13}{20}$
- **B.** $1\frac{1}{4}$
- **C.** $1\frac{4}{5}$
- **D.** $1\frac{2}{5}$

f. $2\frac{1}{3}$ hours = _____ minutes

- **A.** 150
- **B.** 120
- **C.** 130
- **D.** 140

g. $\frac{17}{3}$ is equvalent to _____

- **A.** $3\frac{1}{6}$
- **B.** $7\frac{1}{2}$
- **C.** $3\frac{2}{5}$
- **D.** $5\frac{2}{3}$

2. Complete.

a. $3\frac{1}{2} - 2\frac{3}{5} = $ _____

b. $g - 1\frac{3}{4} = 7\frac{3}{44}$, then $g = $ _____

c. $7\frac{2}{5} + 1\frac{1}{4} = 8 + 1 + \frac{1}{4} - $ _____

d. $9\frac{1}{4} - $ _____ $= 3\frac{3}{4}$

e. $\frac{3}{4}$ year = _____ months

f. 150 seconds = _____ minutes

g. $X + 5\frac{1}{2} = 7\frac{3}{4}$, then $X = $ _____

h. $2\frac{b}{9}$ is almost 3 Estimate for $b = $ _____

3. Choose the correct answer.

a. $1\frac{5}{8}+2\frac{7}{12}+\frac{1}{4}=$ _____

  A. $3\frac{7}{12}$ B. $4\frac{5}{6}$ C. $4\frac{7}{12}$ D. $4\frac{11}{24}$

b. $2\frac{4}{5}+1\frac{3}{10}-1\frac{1}{2}=$ _____

  A. $\frac{6}{5}$ B. $3\frac{2}{5}$ C. $1\frac{7}{10}$ D. $2\frac{3}{5}$

c. $4\frac{3}{5}\neq$ _____

  A. $8\frac{6}{10}$ B. $\frac{23}{5}$ C. $4\frac{6}{10}$ D. $3\frac{8}{5}$

d. If $2\frac{2}{3}-h=1$, then $h=$ _____

  A. $3\frac{2}{3}$ B. $1\frac{2}{3}$ C. $\frac{2}{3}$ D. 2

e. $5\frac{3}{7}+2\frac{1}{11}$ can estimated as _____

  A. 7 B. $7\frac{1}{2}$ C. 8 D. $8\frac{1}{2}$

f. $7\frac{4}{5}-3\frac{1}{2}=$ _____

  A. $4\frac{3}{3}$ B. $4\frac{3}{4}$ C. $4\frac{3}{10}$ D. $10\frac{5}{7}$

g. If $9\frac{X}{5}$ is little greater than $9\frac{1}{2}$, then X is estimated as _____

  A. 3 B. 5 C. 2 D. 1

4. Answer the following.

a. Marwan studied math for $3\frac{1}{2}$ hours and science for 90 minutes.
How many hours did Marwan study in all ?

_____

b. Sameh ate $1\frac{3}{4}$ kg of fruits, Bassem ate $\frac{1}{5}$ kg more than Sameh and Wael ate $\frac{1}{2}$ kg less than Sameh.
How many kg of fruits did the three friends eat together ?

_____

c. Use an area model to add.

$2\frac{3}{5}+1\frac{1}{2}=$ _____

☐ ☐ ☐ + ☐ ☐

d. Use a number line to find the difference.

$9\frac{1}{3}-7\frac{1}{2}=$ _____

UNIT

9

Multiplying and Dividing Fractions

» **Concept 1 :** Multiplying Fractions and Mixed Numbers
» **Concept 2 :** Dividing Whole Numbers and Unit Fractions

Fast Fact

In the wild, giant pandas spent about $\frac{1}{2}$ of the day eating bamboo. They sleep about $\frac{2}{5}$ of the day.

How many hours do they spend for each of eating and sleeping ?

Concept 1

Multiplying Fractions and Mixed Numbers

Lesson No.	Lesson Name	Learning Objectives
Lessons 1 & 2	Multiplying a Fraction or Mixed Number by a Whole Number	• Students will multiply a fraction or a mixed number by a whole number.
	Estimating Products of Fractions and Mixed Numbers	• Students will explain how a product changes when a fraction or mixed number is multiplied by a factor greater than 1. • Students will explain how a product changes when a fraction or mixed number is multiplied by a factor less than 1. • Students will estimate the product of fractions and mixed numbers.
Lessons 3 & 4	Understanding Multiplication with Fractions	• Students will use models to represent multiplication of a fraction by a fraction.
	Multiplying Fractions by Fractions	• Students will multiply a fraction by a fraction. • Students will simplify fractions.
Lessons 5 to 7	Multiplying Fractions and Mixed Numbers	• Students will multiply a fraction by a mixed number. • Students will simplify fractions and mixed numbers.
	Multiplying Mixed Numbers	• Students will draw area models to multiply mixed numbers. • Students will use the Distributive Property of Multiplication to multiply mixed numbers. • Students will simplify fractions and mixed numbers.
	Multiplying Mixed Numbers Using Improper Fractions	• Students will multiply mixed numbers using improper fractions. • Students will simplify fractions and mixed numbers.
Lesson 8	Story Problems Involving Multiplication of Fractions and Mixed Numbers	• Students will solve story problems involving multiplication of fractions and mixed numbers. • Students will simplify fractions and mixed numbers.

- **Multiplying a Fraction or Mixed Number by a Whole Number**
- **Estimating Products of Fractions and Mixed Numbers**

Learn ❶ Multiplying a fraction or mixed number by a whole number

To evaluate : $\frac{6}{8} \times 4$

1 Using repeated addition

$$\frac{6}{8} \times 4 = \frac{6}{8} + \frac{6}{8} + \frac{6}{8} + \frac{6}{8} = \frac{24}{8} = 3$$

2 Using number line

We divide each unit on the number line into **8** equal parts as the denominator.
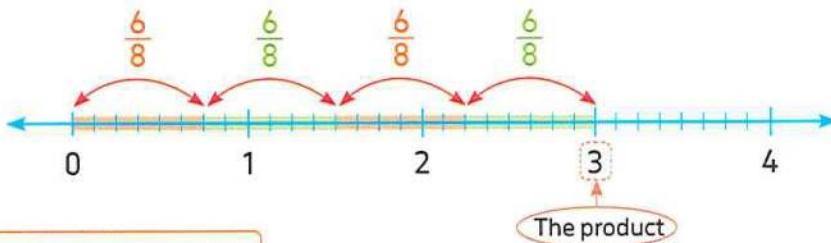
The product

3 Using area model

$$\frac{6}{8} \times 4 = \frac{1}{8} \times 24 = \frac{24}{8} = 3$$

Note that

To evaluate $\frac{6}{8} \times 4$ multiply the numerator of the fraction by the whole number as follows :

$$\frac{6}{8} \times 4 = \frac{6 \times 4}{8} = \frac{24}{8} = 3$$

There are many different multiplication expressions that have the same product as $\frac{6}{8} \times 4$

use a unit fraction

$\frac{1}{8} \times 24$

the whole number and the fraction are switched by using commutative property

$4 \times \frac{6}{8}$

$6 \times \frac{4}{8}$

the whole number and the numerator are switched by using commutative property

$\frac{6}{8} \times 4$

write a whole number as a fraction

$\frac{6}{8} \times \frac{4}{1}$

$\frac{3}{4} \times 4$

use $\frac{6}{8}$ in the simplest form as $\frac{3}{4}$

$\frac{12}{8} \times 2$

$\frac{3}{8} \times 8$

one factor of the two factors (6 and 4) has been double while the other factor is half the original factor

To evaluate : $1\frac{1}{4} \times 3$

1 Using repeated addition

$1\frac{1}{4} \times 3 = 1\frac{1}{4} + 1\frac{1}{4} + 1\frac{1}{4} = 3\frac{3}{4}$

2 Using number line

We divide each unit on the number line into 4 equal parts as the denominator.
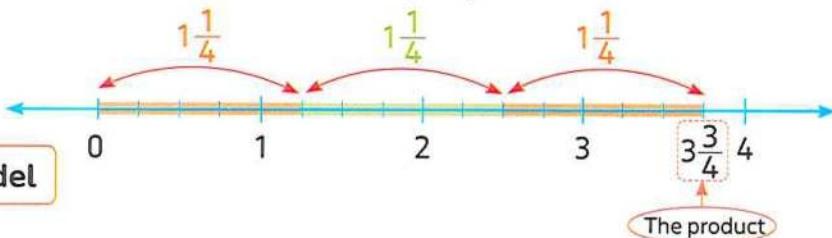
3 Using area model

$1\frac{1}{4} \times 3 = 3 + \frac{3}{4} = 3\frac{3}{4}$

4 Using distributive property

$1\frac{1}{4} \times 3 = (1 + \frac{1}{4}) \times 3 = 1 \times 3 + \frac{1}{4} \times 3 = 3 + \frac{3}{4} = 3\frac{3}{4}$

5 Rewriting the mixed number as an improper fraction

$$1\frac{1}{4} \times 3 = \frac{5}{4} \times 3 = \frac{15}{4} = 3\frac{3}{4}$$

Note that

$$1\frac{1}{4} = \frac{5}{4}$$

Example

Multiply each of the following.

a. $\frac{1}{6} \times 5$

b. $\frac{1}{8} \times 2$

c. $12 \times \frac{3}{4}$

d. $2\frac{1}{5} \times 3$

e. $3\frac{3}{8} \times 6$

f. $\frac{8}{10} \times 8$

Solution

a. $\frac{1}{6} \times 5 = \frac{1 \times 5}{6} = \frac{5}{6}$

b. $\frac{1}{8} \times 2 = \frac{1}{8} \times \overset{1}{\underset{4}{2}} = \frac{1 \times 1}{4} = \frac{1}{4}$

c. $12 \times \frac{3}{4} = \overset{3}{12} \times \frac{3}{\underset{1}{4}} = \frac{3 \times 3}{1} = \frac{9}{1} = 9$

d. $2\frac{1}{5} \times 3 = (2 + \frac{1}{5}) \times 3 = 2 \times 3 + \frac{1}{5} \times 3 = 6 + \frac{3}{5} = 6\frac{3}{5}$

e. $3\frac{3}{8} \times 6 = (3 + \frac{3}{8}) \times 6 = 3 \times 6 + \frac{3}{8} \times 6 = 18 + \frac{18}{8} = 18 + \frac{\overset{9}{18}}{\underset{4}{8}} = 18 + \frac{9}{4}$

$$= 18 + 2\frac{1}{4} = 20\frac{1}{4}$$

Another solution:

$$3\frac{3}{8} \times 6 = \frac{27}{8} \times 6 = \frac{27}{\underset{4}{8}} \times \overset{3}{6} = \frac{81}{4} = 20\frac{1}{4}$$

f. $\frac{8}{10} \times 8 = \frac{8 \times 8}{10} = \frac{64}{10} = 6\frac{4}{10} = 6\frac{2}{5}$

✓ Check your understanding

1. Multiply each of the following.

a. $\frac{3}{5} \times 4$

b. $2\frac{1}{4} \times 3$

c. $5\frac{2}{7} \times 8$

2. Write at least two different multiplication expressions that have the same product as $8 \times \frac{6}{7}$

Learn ❷ Estimating products of fractions and mixed numbers

- If we multiply a given number by a fraction greater than 1, then the product is greater than the given number.

- If we multiply a given number by a fraction less than 1, then the product is less than the given number.

For Example :

- $\dfrac{3}{4} \times \dfrac{4}{7}$ is less than $\dfrac{3}{4}$ (because $\dfrac{4}{7} < 1$)

- $3\dfrac{5}{6} \times \dfrac{7}{4}$ is greater than $3\dfrac{5}{6}$ (because $\dfrac{7}{4} > 1$)

- $4\dfrac{2}{3} \times \dfrac{4}{4}$ is equal to $4\dfrac{2}{3}$ (because $\dfrac{4}{4} = 1$)

- If we multiply a given number by a half, then the product is half the given number.

For Example :

- $\dfrac{4}{5} \times \dfrac{1}{2}$ = half of $\dfrac{4}{5}$ = $\dfrac{2}{5}$

- $\dfrac{6}{7} \times 1\dfrac{1}{2} = \dfrac{6}{7} \times \left(1 + \dfrac{1}{2}\right) = \dfrac{6}{7} \times 1 + \dfrac{6}{7} \times \dfrac{1}{2} = \dfrac{6}{7} + \dfrac{3}{7} = \dfrac{9}{7} = 1\dfrac{2}{7}$

- $\dfrac{2}{5} \times 4\dfrac{1}{2} = \dfrac{2}{5} \times \left(4 + \dfrac{1}{2}\right) = \dfrac{2}{5} \times 4 + \dfrac{2}{5} \times \dfrac{1}{2} = \dfrac{8}{5} + \dfrac{1}{5} = \dfrac{9}{5} = 1\dfrac{4}{5}$

✓ Check your understanding

1. Evaluate the product of each of the following (simplify your answers, if possible).

a. $\dfrac{8}{10} \times \dfrac{1}{2}$ b. $\dfrac{4}{9} \times 1\dfrac{1}{2}$ c. $\dfrac{1}{4} \times 3\dfrac{1}{2}$

2. Choose.

a. $3\dfrac{4}{5} \times \dfrac{3}{17}$ (less than / greater than / equal to) $3\dfrac{4}{5}$

b. $3\dfrac{4}{5} \times \dfrac{17}{3}$ (less than / greater than / equal to) $3\dfrac{4}{5}$

c. $3\dfrac{4}{5} \times \dfrac{17}{17}$ (less than / greater than / equal to) $3\dfrac{4}{5}$

• **Multiplying a Fraction or Mixed Number by a Whole Number**
• **Estimating Products of Fractions and Mixed Numbers**

● REMEMBER   ● UNDERSTAND   ○ APPLY   •• PROBLEM SOLVING   📖 From the school book

1. Complete using repeated addition.

a. $\frac{3}{17} \times 5 =$ —————

b. $\frac{8}{10} \times 3 =$ —————

c. $2\frac{3}{11} \times 3 =$ —————

d. $3\frac{1}{3} \times 4 =$ —————

2. Complete using the number line.

a. $\frac{2}{3} \times 5 =$ ————
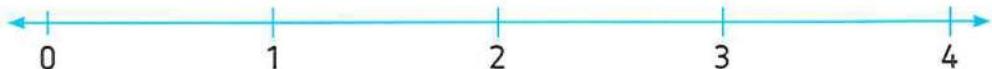
b. $\frac{3}{4} \times 4 =$ ————

c. $1\frac{1}{5} \times 3 =$ ————
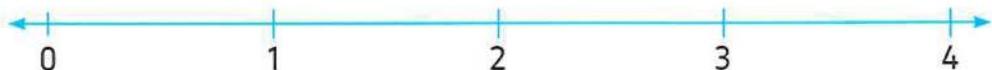
3. Find using the area model.

a. $\frac{4}{5} \times 3$
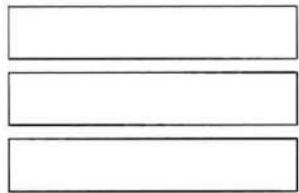
b. $1\frac{3}{4} \times 3$
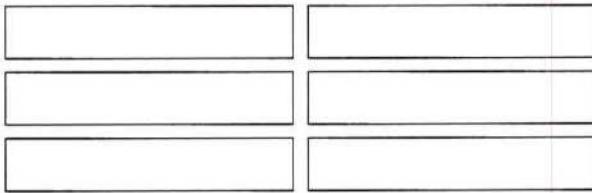
4. Multiply, then write the result in its simplest form.

a. $\frac{1}{3} \times 5$

b. $4 \times \frac{1}{4}$

c. $\frac{2}{7} \times 21$

d. $\frac{3}{5} \times 15$

e. $9 \times \frac{5}{6}$

f. $\frac{1}{25} \times 10$

g. $2\frac{3}{7} \times 4$

h. $5\frac{1}{4} \times 8$

i. $2\frac{2}{5} \times 6$

5. Complete the input-output tables. Simplify your answers, if possible.

a. 📖

Rule : × $\frac{9}{10}$	
Input	Output
2	_____
4	_____
6	_____
8	_____

b. 📖

Rule : × 10 $\frac{1}{4}$	
Input	Output
2	_____
4	_____
6	_____
8	_____

c. 📖

Rule : × 3 $\frac{5}{8}$	
Input	Output
2	_____
4	_____
6	_____
8	_____

d.

Rule : × _____	
Input	Output
5	$\frac{5}{9}$
3	_____
4	_____
6	_____

6. 📖 As a caretaker, Ezz walks the perimeter of the garden 3 days per week. The perimeter of the garden is $2\frac{1}{5}$ kilometers. **What is the total distance Ezz walks each week ? Use more than one strategy.**

7. 📖 Ezz notices that $\frac{2}{3}$ of the 6 rose bushes are in bloom.

How many rose bushes are in bloom ?

8. 📖 Write at least two different multiplication expressions that have

the same product as $4 \times \frac{6}{10}$

9. Write at least three different multiplication expressions that have

the same product as $\frac{12}{13} \times 8$

10. 📖 **Using the rule of multiplying by a half to evaluate each product.**

a. $\frac{2}{3} \times \frac{1}{2} =$ _____ , $\frac{2}{3} \times 1\frac{1}{2} =$ _____

b. $\dfrac{4}{5} \times \dfrac{1}{2} = $ _____ , $\dfrac{4}{5} \times 1\dfrac{1}{2} = $ _____

c. $\dfrac{8}{10} \times \dfrac{1}{2} = $ _____ , $\dfrac{8}{10} \times 2\dfrac{1}{2} = $ _____

d. $\dfrac{4}{12} \times \dfrac{1}{2} = $ _____ , $\dfrac{4}{12} \times 3\dfrac{1}{2} = $ _____

e. $\dfrac{3}{5} \times \dfrac{1}{2} = $ _____ , $\dfrac{3}{5} \times 1\dfrac{1}{2} = $ _____

f. $\dfrac{1}{4} \times \dfrac{1}{2} = $ _____ , $\dfrac{1}{4} \times 2\dfrac{1}{2} = $ _____

11. Complete.

a. $\dfrac{4}{11} \times 0.5 = $ _____

b. $\dfrac{8}{9} \times 3.5 = $ _____

c. $3\dfrac{1}{2} \times \dfrac{6}{9} = $ _____

d. $\dfrac{6}{8} \times 2\dfrac{1}{2} = $ _____

e. $\dfrac{5}{3} \times 6 \times \dfrac{2}{7} = $ _____

f. $\dfrac{2}{5} \times 20 \times \dfrac{3}{4} = $ _____

g. $1\dfrac{2}{7} \times 3 = 1 \times 3 + $ _____ $\times$ _____

h. $7\dfrac{2}{3} \times 4 = $ _____ $\times$ _____ $+ \dfrac{2}{3} \times 4$

i. $2\dfrac{4}{5} \times 3 = 3 \times \dfrac{\quad}{\quad}$

j. $5 \times 3\dfrac{2}{11} = \dfrac{\quad}{\quad} \times 5$

k. $4\dfrac{7}{8} \times \dfrac{\quad}{5} = 4\dfrac{7}{8}$

l. $8\dfrac{1}{3} \times \dfrac{9}{\quad} = 8\dfrac{1}{3}$

m. If $\dfrac{4}{13} \times a = \dfrac{4}{13} + \dfrac{2}{13}$, then $a = $ _____

n. If $\dfrac{6}{17} \times b = \dfrac{6}{17} + \dfrac{6}{17} + \dfrac{3}{17}$, then $b = $ _____

12. 📖 **Indicate whether each product is less than, equal to, or greater than the first factor.**

a. $\dfrac{3}{5} \times \dfrac{5}{3}$ [less than / greater than / equal to] $\dfrac{3}{5}$

b. $\dfrac{3}{5} \times \dfrac{3}{5}$ [less than / greater than / equal to] $\dfrac{3}{5}$

c. $\dfrac{3}{5} \times \dfrac{10}{5}$ [less than / greater than / equal to] $\dfrac{3}{5}$

d. $\dfrac{3}{5} \times \dfrac{10}{100}$ [less than / greater than / equal to] $\dfrac{3}{5}$

e. $\frac{7}{4} \times \frac{4}{7}$ [less than / greater than / equal to] $\frac{7}{4}$

f. $\frac{7}{4} \times \frac{4}{1}$ [less than / greater than / equal to] $\frac{7}{4}$

g. $\frac{7}{4} \times \frac{4}{4}$ [less than / greater than / equal to] $\frac{7}{4}$

h. $\frac{7}{4} \times \frac{99}{100}$ [less than / greater than / equal to] $\frac{7}{4}$

i. $1\frac{5}{6} \times \frac{5}{6}$ [less than / greater than / equal to] $1\frac{5}{6}$

j. $1\frac{5}{6} \times \frac{15}{16}$ [less than / greater than / equal to] $1\frac{5}{6}$

k. $1\frac{5}{6} \times \frac{16}{15}$ [less than / greater than / equal to] $1\frac{5}{6}$

l. $1\frac{5}{6} \times \frac{16}{16}$ [less than / greater than / equal to] $1\frac{5}{6}$

---

13. 📖 Basma sells bunches of colorful chrysanthemums that she ties up with string. The medium bouquet uses $\frac{6}{10}$ meter of string. The small bouquet uses half as much string as the medium bouquet. The large bouquet uses $1\frac{1}{2}$ times more string than the medium bouquet.

Find how much string Basma uses for the small, medium, and large bouquets of chrysanthemums.

chrysanthemums

Choose the correct answer.

1. $2\frac{1}{4} \times 4 = $ _____

   A. $8\frac{1}{4}$ B. 9

   C. $9\frac{1}{2}$ D. 10

2. $5\frac{3}{5} \times \frac{7}{8}$ is _____ $5\frac{3}{5}$

   A. less than

   B. greater than

   C. equal to

3. $\frac{3}{5} \times \frac{1}{2} = $ _____

   A. $\frac{3}{2}$ B. $\frac{6}{5}$

   C. $\frac{3}{5}$ D. $\frac{3}{10}$

4. $4\frac{3}{7} \times 5 = 4 \times 5 + $ _____

   A. $4 \times \frac{3}{7}$ B. $\frac{12}{7}$

   C. $\frac{3}{7} \times 5$ D. $\frac{7}{3} \times 5$

5. $7\frac{4}{9} \times \frac{6}{4}$ is _____ $7\frac{4}{9}$

   A. less than

   B. greater than

   C. equal to

6. $\frac{8}{11} \times 2.5 = $ _____

   A. $\frac{16}{11}$ B. $1\frac{9}{11}$

   C. $\frac{11}{20}$ D. $1\frac{2}{11}$

7. If $\frac{8}{19} \times a = \frac{8}{19} + \frac{8}{19} + \frac{4}{19}$, then $a = $ _____

   A. 2

   B. $2\frac{1}{2}$

   C. 3

   D. $3\frac{1}{2}$

8. The opposite shaded area model represents _____

   A. $1\frac{1}{3} \times 3$

   B. $1\frac{2}{3} \times 3$

   C. $1\frac{1}{3} \times 4$

   D. $1\frac{2}{3} \times 4$

9. $6 \times 2\frac{5}{8} = $ _____

   A. $15\frac{3}{4}$ B. $12\frac{5}{8}$

   C. $14\frac{3}{8}$ D. $15\frac{3}{8}$
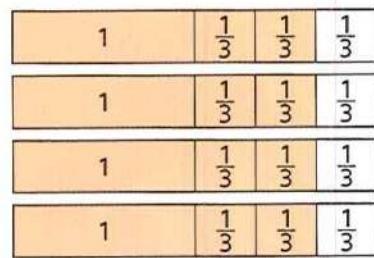
10. $5\frac{1}{5} \times \frac{4}{4}$ is _____ $5\frac{1}{5}$

   A. less than

   B. greater than

   C. equal to

- **Understanding Multiplication with Fractions**
- **Multiplying Fractions by Fractions**

Learn 1   Multiplying fractions by fractions using rectangular model

To evaluate : $\frac{2}{3} \times \frac{3}{5}$

- Draw the area model of $\frac{2}{3}$ vertically as in fig. [1].

- Draw the area model of $\frac{3}{5}$ horizontally as in fig. [2].
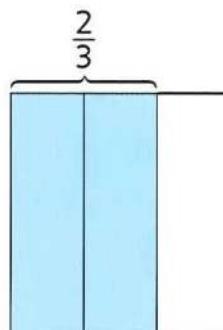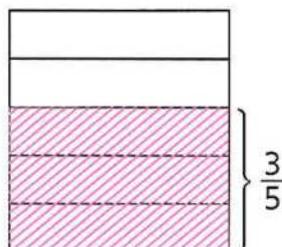
Fig.[1]   Fig.[2]

- **Use different colors, if possible.**

- Imagine the two models if one of them above the other.

- Redraw the models using one rectangle.   Fig.[3]

- Divide the rectangle vertically into thirds and horizontally into fifths as in fig.[3].

- The product $\frac{2}{3} \times \frac{3}{5}$ is shown where the shading overlaps.

- We have [6 out of 15] overlapping shading , then $\frac{2}{3} \times \frac{3}{5} = \frac{6}{15}$ or $\frac{2}{5}$
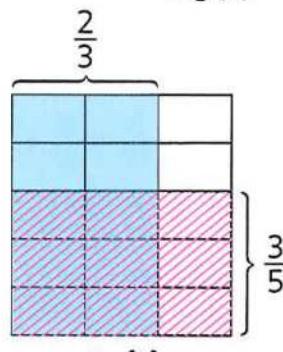
Example 1

Use the area model to evaluate each of the following.

a. $\dfrac{1}{2} \times \dfrac{2}{3}$

b. $\dfrac{2}{3} \times \dfrac{4}{5}$

c. $\dfrac{5}{6} \times \dfrac{3}{4}$

Solution

a.
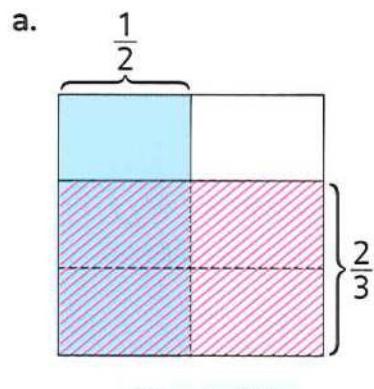
(2 out of 6)

$$\dfrac{1}{2} \times \dfrac{2}{3} = \dfrac{2}{6} \text{ or } \dfrac{1}{3}$$

b.

(8 out of 15)

$$\dfrac{2}{3} \times \dfrac{4}{5} = \dfrac{8}{15}$$

c.
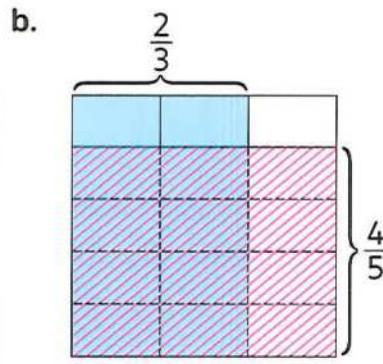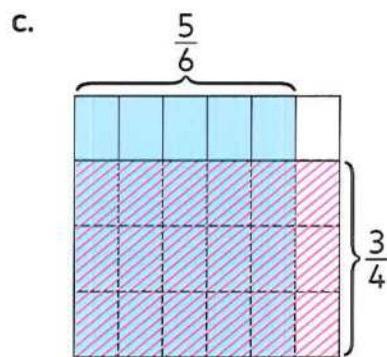
(15 out of 24)

$$\dfrac{5}{6} \times \dfrac{3}{4} = \dfrac{15}{24} \text{ or } \dfrac{5}{8}$$

✓ Check your understanding

Use the rectangular model to find each of the following.

a. $\dfrac{1}{5} \times \dfrac{1}{3}$
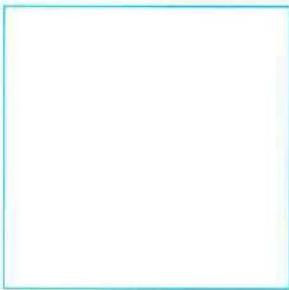
$$\dfrac{1}{5} \times \dfrac{1}{3} = \text{\_\_\_\_\_}$$

b. $\dfrac{1}{4} \times \dfrac{2}{5}$
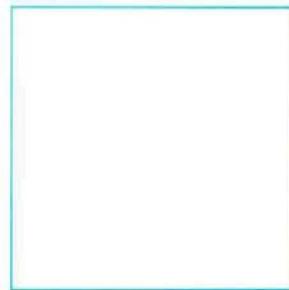
$$\dfrac{1}{4} \times \dfrac{2}{5} = \text{\_\_\_\_\_}$$

c. $\dfrac{3}{8} \times \dfrac{1}{2}$

$$\dfrac{3}{8} \times \dfrac{1}{2} = \text{\_\_\_\_\_}$$

Learn ② Multiplying fractions by fractions

To evaluate : $\dfrac{5}{6} \times \dfrac{2}{15}$

Step 1
- Multiply the numerators.
- Multiply the denominators.

$\dfrac{5}{6} \times \dfrac{2}{15} = \dfrac{5 \times 2}{6 \times 15} = \dfrac{10}{90}$

➡️

Step 2
- Simplify the result.

$\dfrac{5}{6} \times \dfrac{2}{15} = \dfrac{10}{90} = \dfrac{1}{9}$

So, $\dfrac{5}{6} \times \dfrac{2}{15} = \dfrac{1}{9}$

- If the numerator and the denominator have a common factor, then it is better to simplify before you multiply by dividing each of them by this common factor as follows :

Step 1
- Simplify the opposite pairs (divide common factor).

$\dfrac{5}{6} \times \dfrac{2}{15} = \dfrac{\overset{1}{\cancel{5}}}{\underset{3}{\cancel{6}}} \times \dfrac{\overset{1}{\cancel{2}}}{\underset{3}{\cancel{15}}}$

➡️

Step 2
- Multiply the numerators.
- Multiply the denominators.

$\dfrac{\overset{1}{\cancel{5}}}{\underset{3}{\cancel{6}}} \times \dfrac{\overset{1}{\cancel{2}}}{\underset{3}{\cancel{15}}} = \dfrac{1 \times 1}{3 \times 3} = \dfrac{1}{9}$

So, $\dfrac{5}{6} \times \dfrac{2}{15} = \dfrac{1}{9}$

Example 2

Multiply each of the following fractions.

a. $\dfrac{7}{8} \times \dfrac{16}{21}$ 　　b. $\dfrac{3}{5} \times \dfrac{25}{36}$ 　　c. $0.6 \times \dfrac{1}{2}$

Solution 💡

a. $\dfrac{7}{8} \times \dfrac{16}{21} = \dfrac{\overset{1}{\cancel{7}}}{\underset{1}{\cancel{8}}} \times \dfrac{\overset{2}{\cancel{16}}}{\underset{3}{\cancel{21}}} = \dfrac{1 \times 2}{1 \times 3} = \dfrac{2}{3}$

b. $\dfrac{3}{5} \times \dfrac{25}{36} = \dfrac{\overset{1}{\cancel{3}}}{\underset{1}{\cancel{5}}} \times \dfrac{\overset{5}{\cancel{25}}}{\underset{12}{\cancel{36}}} = \dfrac{1 \times 5}{1 \times 12} = \dfrac{5}{12}$

c. We convert the decimal into a fraction as : $0.6 = \dfrac{\overset{3}{\cancel{6}}}{\underset{5}{\cancel{10}}} = \dfrac{3}{5}$, then $0.6 \times \dfrac{1}{2} = \dfrac{3}{5} \times \dfrac{1}{2} = \dfrac{3}{10}$

✅ Check your understanding

Multiply.

a. $\dfrac{2}{3} \times \dfrac{3}{4}$ 　　b. $\dfrac{5}{6} \times \dfrac{3}{20}$ 　　c. $\dfrac{10}{9} \times \dfrac{12}{15}$ 　　d. $\dfrac{3}{4} \times \dfrac{16}{9}$

• Understanding Multiplication with Fractions
• Multiplying Fractions by Fractions

● REMEMBER   ● UNDERSTAND   ○ APPLY   ⁘ PROBLEM SOLVING   📖 From the school book

1. Color the area model to evaluate each of the following.

a. $\frac{1}{2} \times \frac{1}{4}$
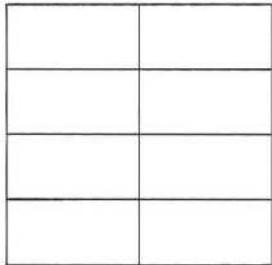
, then $\frac{1}{2} \times \frac{1}{4} = $ ———
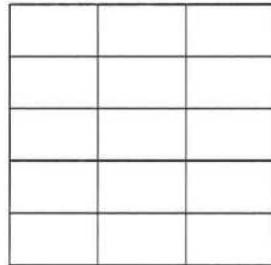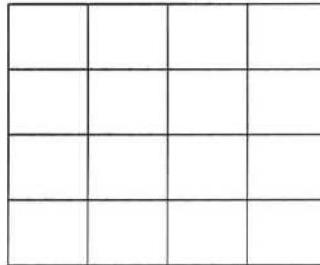
b. $\frac{2}{3} \times \frac{2}{5}$

, then $\frac{2}{3} \times \frac{2}{5} = $ ———

c. $\frac{3}{4} \times \frac{3}{4}$

, then $\frac{3}{4} \times \frac{3}{4} = $ ———

d. $\frac{1}{7} \times \frac{2}{3}$
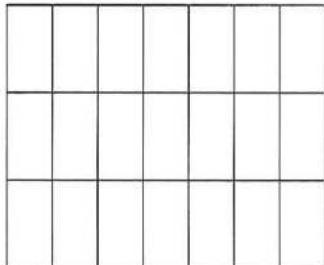
, then $\frac{1}{7} \times \frac{2}{3} = $ ———

e. $\frac{4}{5} \times \frac{2}{5}$
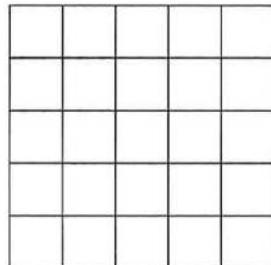
, then $\frac{4}{5} \times \frac{2}{5} = $ ———

f. $\frac{5}{6} \times \frac{1}{3}$
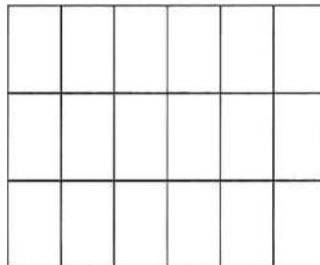
, then $\frac{5}{6} \times \frac{1}{3} = $ ———

2. 📖 Use an area model to show fraction multiplication. Draw a model for each factor and then draw a model to represent the problem. Label each model. Use a different color for each factor. Simplify your answers, if possible.

a. $\frac{1}{2} \times \frac{1}{5} = $ ———

b. $\frac{3}{4} \times \frac{1}{2} = $ ———

c. $\frac{5}{6} \times \frac{2}{5} = $ ———

d. $\frac{3}{6} \times \frac{5}{6} = $ ———

e. $\frac{3}{5} \times \frac{1}{4} = $ ———

f. $\frac{3}{4} \times \frac{3}{8} = $ ———

g. $\frac{1}{3} \times \frac{3}{8} = $ ———

h. $\frac{5}{8} \times \frac{3}{3} = $ ———

3. Multiply, then write the answer in its simplest form if possible.

a. 📖 $\frac{1}{2} \times \frac{2}{8}$

b. 📖 $\frac{1}{4} \times \frac{1}{4}$

c. 📖 $\frac{1}{3} \times \frac{2}{7}$

d. $\frac{1}{8} \times \frac{2}{3}$

e. $\frac{2}{9} \times \frac{3}{8}$

f. $\frac{1}{2} \times \frac{4}{5}$

g. $\frac{2}{5} \times \frac{1}{4}$

h. $\frac{3}{4} \times \frac{8}{9}$

i. $\frac{4}{9} \times \frac{3}{16}$

j. 📖 $\frac{5}{10} \times \frac{8}{10}$

k. 📖 $\frac{3}{9} \times \frac{3}{4}$

l. 📖 $\frac{3}{8} \times \frac{1}{6}$

m. 📖 $\frac{1}{4} \times \frac{8}{11}$

n. 📖 $\frac{4}{5} \times \frac{4}{9}$

o. 📖 $\frac{5}{12} \times \frac{3}{5}$

p. 📖 $\frac{5}{8} \times \frac{2}{15}$

q. $\frac{1}{2} \times \frac{4}{13}$

r. $\frac{5}{3} \times \frac{9}{20}$

s. $\frac{2}{3} \times \frac{6}{7} \times \frac{7}{8}$

t. $\frac{4}{10} \times \frac{25}{3} \times \frac{3}{15}$

u. $\frac{4}{7} \times \frac{14}{24} \times \frac{3}{5}$

v. $\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \frac{5}{6} \times \frac{6}{7} \times \frac{7}{8}$

4. 📖 Study the multiplication area models and fill in the missing fraction. Then, enter the product. Simplify your answers, if possible.

a.

$\frac{2}{6} \times$ _____ = _____

b.

_____ $\times \frac{3}{5} =$ _____

c.

$\frac{5}{8} \times$ _____ = _____

d.

_____ $\times \frac{4}{9} =$ _____
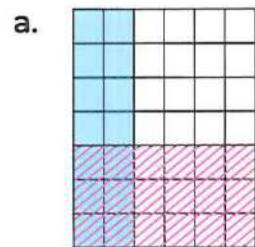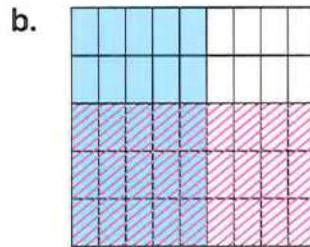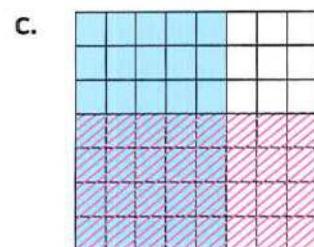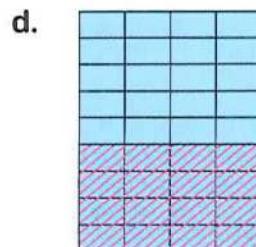
5. Multiply, then write the answer in its simplest form.

   a. $0.25 \times \frac{4}{5}$

   b. $\frac{4}{20} \times 0.8$

   c. $\frac{3}{5} \times 1.5$

   d. $0.6 \times \frac{15}{16} \times \frac{8}{9}$

   e. $\frac{1}{25} \times 50 \times 0.25$

   f. $0.6 \times 20 \times \frac{2}{5}$

6. Complete.

   a. $\frac{1}{4} \times \frac{\quad}{3} = \frac{7}{12}$

   b. $\frac{4}{5} \times \underline{\quad} = \frac{4}{15}$

   c. $\frac{1}{2} \times \underline{\quad} = \frac{3}{8}$

   d. $\frac{2}{7} \times \underline{\quad} = \frac{10}{49}$

   e. $\underline{\quad} \times \frac{3}{8} = \frac{15}{24}$

   f. $\underline{\quad} \times \frac{3}{5} = \frac{6}{15}$

   g. $\underline{\quad} \times \frac{3}{17} = \frac{2}{17}$

   h. $\underline{\quad} \times \frac{1}{4} \times \frac{2}{5} = \frac{1}{15}$

   i. $\frac{2}{3} \times \underline{\quad} \times \frac{3}{4} = \frac{1}{4}$

7. 📖 Aya is planning a garden. She wants $\frac{2}{3}$ of her garden to be planted with vegetables. she also wants $\frac{1}{4}$ of the vegetables to be leeks and $\frac{3}{4}$ of them to be peas.

   Explain whether she can use multiplication to describe the fraction of her garden that will contain leeks and the fraction that will contain peas.

   Pea Pods

8. 📖 Maha made a model for $\frac{1}{3} \times \frac{3}{5}$ but is having trouble finding the product. Help her fix her model. Then, find the product and explain your thinking.
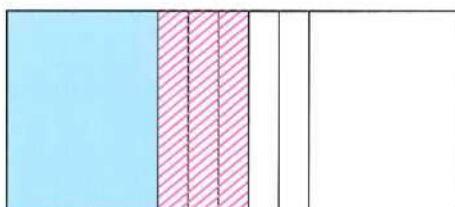
Choose the correct answer.

1. $\frac{2}{15} \times \frac{5}{6} = $ _____

A. $\frac{1}{3}$ B. $\frac{1}{6}$ C. $\frac{1}{8}$ D. $\frac{1}{9}$

2. $\frac{1}{5} \times 0.5 = $ _____

A. $\frac{2}{7}$ B. $\frac{1}{7}$ C. $\frac{1}{10}$ D. $\frac{1}{25}$

3. $\frac{1}{4} \times \frac{4}{5}$ ⬚ $\frac{1}{2} \times \frac{2}{5}$

A. >   B. <   C. =

4. What is the product of $\frac{4}{5}$ and $\frac{3}{3}$?

A. $\frac{4}{5}$ B. $\frac{7}{8}$ C. 1   D. $\frac{4}{15}$

5. $0.25 \times \frac{8}{9} = $ _____

A. $\frac{1}{4}$ B. $\frac{2}{3}$ C. $\frac{4}{9}$ D. $\frac{2}{9}$

6. $\frac{3}{\underline{}} \times \frac{4}{5} = \frac{12}{35}$

A. 5   B. 6   C. 7   D. 8

7. $\frac{2}{3} \times \frac{3}{8} \times \frac{8}{9} = $ _____

A. $\frac{1}{3}$ B. $\frac{2}{9}$ C. $\frac{13}{20}$ D. $\frac{2}{17}$

8. $\frac{1}{3} \times \frac{6}{7}$ ⬚ $\frac{4}{7} - \frac{1}{7}$

A. >   B. <   C. =

9. The opposite model represents _____

A. $\frac{1}{3} \times \frac{2}{3}$ B. $\frac{1}{4} \times \frac{2}{5}$

C. $\frac{3}{4} \times \frac{3}{5}$ D. $\frac{1}{4} \times \frac{3}{4}$
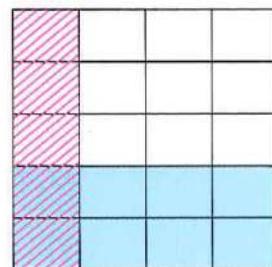
10. Which of the models below shows $\frac{1}{6} \times \frac{1}{3}$?
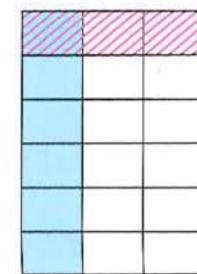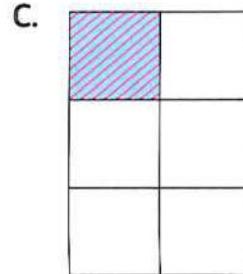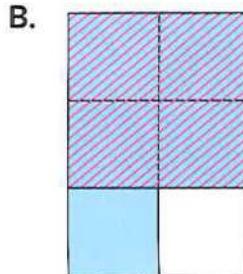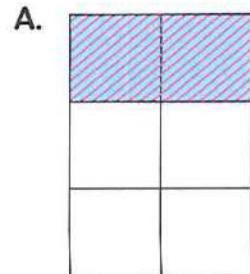
A.   B.   C.   D.

- **Multiplying Fractions and Mixed Numbers**
- **Multiplying Mixed Numbers**
- **Multiplying Mixed Numbers Using Improper Fractions**
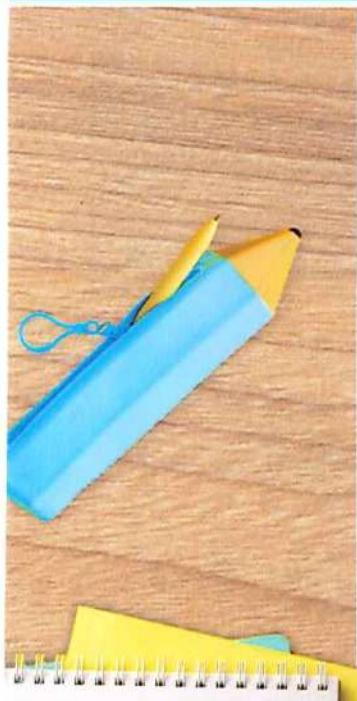
Learn	**Multiplying a mixed number by a fraction or a mixed number**

To evaluate : $2\frac{1}{4} \times \frac{2}{3}$

1 Using area model
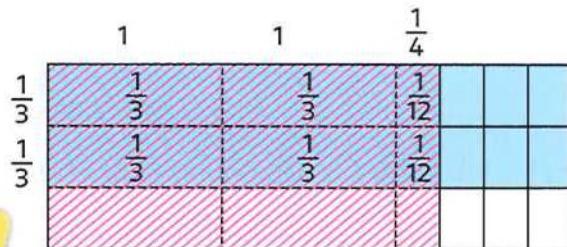
It is important to draw one factor horizontally and the other factor vertically.

$$2\frac{1}{4} \times \frac{2}{3} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{12} + \frac{1}{12} = \frac{4}{3} + \frac{2}{12} = \frac{16}{12} + \frac{2}{12} = \frac{18}{12} = \frac{3}{2} = 1\frac{1}{2}$$

2 Using distributive property

$$2\frac{1}{4} \times \frac{2}{3} = \left(2 + \frac{1}{4}\right) \times \frac{2}{3} = \left(2 \times \frac{2}{3}\right) + \left(\frac{1}{4} \times \frac{2}{3}\right) = \frac{4}{3} + \frac{2}{12} = \frac{4}{3} + \frac{1}{6}$$
$$= \frac{8}{6} + \frac{1}{6} = \frac{9}{6} = \frac{3}{2} = 1\frac{1}{2}$$

3 Using improper fractions

$$2\frac{1}{4} \times \frac{2}{3} = \frac{\overset{3}{\cancel{9}}}{\underset{2}{\cancel{4}}} \times \frac{\overset{1}{\cancel{2}}}{\underset{1}{\cancel{3}}} = \frac{3}{2} = 1\frac{1}{2}$$

To evaluate : $2\frac{1}{2} \times 1\frac{3}{5}$

1 Using area model

$$2\frac{1}{2} \times 1\frac{3}{5} = 1 + 1 + \frac{1}{2} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10}$$

$$= 2 + \frac{1}{2} + \frac{6}{5} + \frac{3}{10} = \frac{20 + 5 + 12 + 3}{10} = \frac{40}{10} = 4$$
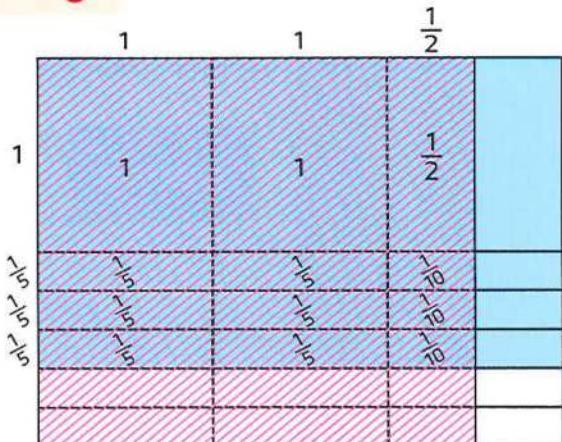
2 Using distributive property

$$2\frac{1}{2} \times 1\frac{3}{5} = \left(2 + \frac{1}{2}\right) \times \left(1 + \frac{3}{5}\right)$$

$$= \left(2 \times 1\right) + \left(2 \times \frac{3}{5}\right) + \left(\frac{1}{2} \times 1\right) + \left(\frac{1}{2} \times \frac{3}{5}\right)$$

$$= 2 + \frac{6}{5} + \frac{1}{2} + \frac{3}{10} = 2 + \frac{12}{10} + \frac{5}{10} + \frac{3}{10}$$

$$= 2 + \frac{20}{10} = 2 + 2 = 4$$

3 Using improper fraction

$$2\frac{1}{2} \times 1\frac{3}{5} = \frac{\overset{1}{\cancel{5}}}{\cancel{2}_{1}} \times \frac{\overset{4}{\cancel{8}}}{\cancel{5}_{1}} = \frac{4}{1} = 4$$

Example

Multiply each of the following.

a. $2\frac{3}{4} \times 1\frac{2}{3}$ (using area model)

b. $1\frac{3}{4} \times 1\frac{2}{7}$ (using distributive property)

c. $\frac{5}{6} \times 7\frac{1}{2}$ (using improper fraction)

Solution 💡

a. $2\frac{3}{4} \times 1\frac{2}{3}$

$$= 1 + 1 + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$$

$$+ \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12}$$

$$= 2 + \frac{4}{3} + \frac{3}{4} + \frac{6}{12} = 2 + \frac{16}{12} + \frac{9}{12} + \frac{6}{12}$$

$$= 2 + \frac{31}{12} = 2 + 2\frac{7}{12} = 4\frac{7}{12}$$
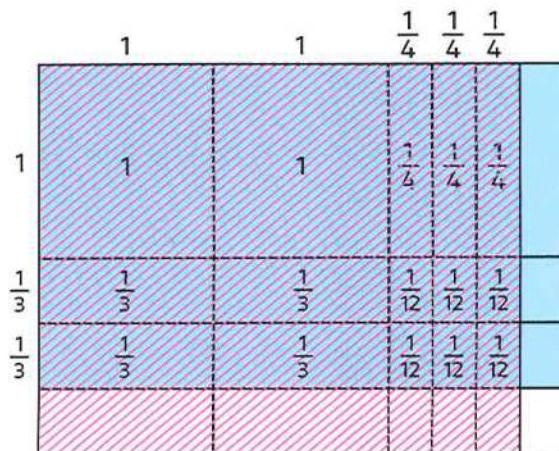
b. $1\frac{3}{4} \times 1\frac{2}{7} = \left(1 + \frac{3}{4}\right) \times \left(1 + \frac{2}{7}\right)$

$\quad = \left(1 \times 1\right) + \left(1 \times \frac{2}{7}\right) + \left(\frac{3}{4} \times 1\right) + \left(\frac{3}{4} \times \frac{2}{7}\right)$

$\quad = 1 + \frac{2}{7} + \frac{3}{4} + \frac{6}{28}$

$\quad = 1 + \frac{8}{28} + \frac{21}{28} + \frac{6}{28} = 1 + \frac{35}{28}$

$\quad = 1 + \frac{5}{4} = 1 + 1\frac{1}{4} = 2\frac{1}{4}$

c. $\frac{5}{6} \times 7\frac{1}{2} = \frac{5}{\underset{2}{6}} \times \frac{\overset{5}{15}}{2} = \frac{25}{4} = 6\frac{1}{4}$

Remarks

1 We know that : $3\frac{1}{5}$ equals $\left(3 + \frac{1}{5}\right)$ Doesn't equal $\left(3 \times \frac{1}{5}\right)$

So, $\left(3\frac{1}{5}\right) \times \left(4\frac{1}{2}\right)$ equals $\left(3 + \frac{1}{5}\right) \times \left(4 + \frac{1}{2}\right)$ Doesn't equal $\left(3 \times \frac{1}{5}\right) + \left(4 \times \frac{1}{2}\right)$

2 We know that : $3\frac{4}{7} \times \frac{2}{5}$ equals $\frac{2}{5} \times 3\frac{4}{7}$ Doesn't equal $3\frac{2}{5} \times \frac{4}{7}$

3 To estimate $\left(3\frac{4}{5} \times \frac{1}{4}\right)$ we find that :

$3\frac{4}{5} \times \frac{1}{4}$ is less than $3\frac{4}{5}$ [because $\frac{1}{4} < 1$]

There is more acurate estimation we can be done : $3\frac{4}{5}$ is rounded up to 4

So, $3\frac{4}{5} \times \frac{1}{4}$ is rounded up $4 \times \frac{1}{4}$ or 1 $\qquad$ So, $3\frac{4}{5} \times \frac{1}{4} < 1$

✓ Check your understanding

Multiply, then write the result in its simplest form.

a. $3\frac{4}{7} \times \frac{1}{5}$ $\qquad$ b. $4\frac{2}{3} \times \frac{3}{7}$ $\qquad$ c. $5\frac{1}{3} \times 2\frac{5}{8}$ $\qquad$ d. $4\frac{2}{5} \times 1\frac{4}{11}$

- **Multiplying Fractions and Mixed Numbers**
- **Multiplying Mixed Numbers**
- **Multiplying Mixed Numbers Using Improper Fractions**

● REMEMBER   ● UNDERSTAND   ○ APPLY   •• PROBLEM SOLVING   📖 From the school book

1. Use an area model to multiply two mixed numbers. Fill in the squares to create an area model to find each product. Simplify your answers, if possible.

a. 📖 $1\frac{1}{2} \times 2\frac{2}{3} =$ _____

b. 📖 $2\frac{3}{4} \times 1\frac{2}{3} =$ _____

c. $1\frac{1}{3} \times 2\frac{3}{4} =$ _____

d. 📖 $3\frac{1}{2} \times 1\frac{2}{5} =$ _____

e. 📖 $2\frac{2}{3} \times 3\frac{1}{5} =$ _____

f. $2\frac{1}{4} \times 3\frac{1}{3} =$ _____

2. Evaluate each product using the distributive property of multiplication. Simplify your answers, if possible.

a. $\frac{2}{5} \times 5\frac{1}{2} =$ _____

b. $1\frac{2}{3} \times \frac{3}{10} =$ _____

c. $8\frac{3}{4} \times \frac{2}{7} =$ _____

d. $\frac{3}{4} \times 8\frac{2}{3} =$ _____

e. 📖 $3\frac{4}{6} \times \frac{1}{4} =$ _____

f. 📖 $\frac{3}{4} \times 2\frac{1}{5} =$ _____

g. 📖 $2\frac{2}{5} \times \frac{2}{3} =$ _____

h. 📖 $\frac{1}{8} \times 3\frac{2}{5} =$ _____

i. 📖 $5\frac{1}{4} \times \frac{1}{2} =$ _____

3. Use the distributive property of multiplication to find each product. Simpilify your answers, if possible.

a. 📖 $2\frac{2}{5} \times 1\frac{1}{2} =$ _____

$$\left(\underline{\quad} + \underline{\quad}\right) \times \left(\underline{\quad} + \underline{\quad}\right)$$

$$= \left(\underline{\quad} \times \underline{\quad}\right) + \left(\underline{\quad} \times \underline{\quad}\right)$$

$$+ \left(\underline{\quad} \times \underline{\quad}\right) + \left(\underline{\quad} \times \underline{\quad}\right)$$

$$= \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$$

$$= \underline{\quad}$$

b. 📖 $2\frac{2}{3} \times 4\frac{3}{5} =$ _____

$$\left(\underline{\quad} + \underline{\quad}\right) \times \left(\underline{\quad} + \underline{\quad}\right)$$

$$= \left(\underline{\quad} \times \underline{\quad}\right) + \left(\underline{\quad} \times \underline{\quad}\right)$$

$$+ \left(\underline{\quad} \times \underline{\quad}\right) + \left(\underline{\quad} \times \underline{\quad}\right)$$

$$= \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$$

$$= \underline{\quad}$$

c. $3\frac{1}{2} \times 2\frac{2}{7} =$ _____

d. $2\frac{1}{2} \times 1\frac{1}{10} =$ _____

e. $5\frac{1}{3} \times 3\frac{3}{8} =$ _____

f. $1\frac{2}{7} \times 2\frac{1}{3} =$ _____

g. 📖 $3\frac{2}{3} \times 2\frac{1}{4} =$ _____

h. 📖 $5\frac{2}{3} \times 1\frac{2}{3} =$ _____

---

4. 📖 Match each mixed number to its equivalent improper fraction.

Mixed Number

a. $3\frac{1}{2}$

b. $4\frac{3}{5}$

c. $2\frac{1}{5}$

d. $6\frac{1}{5}$

e. $5\frac{1}{2}$

f. $2\frac{3}{5}$

g. $1\frac{1}{3}$

h. $2\frac{2}{3}$

Improper Fraction

$\frac{31}{5}$

$\frac{7}{2}$

$\frac{4}{3}$

$\frac{11}{5}$

$\frac{13}{5}$

$\frac{8}{3}$

$\frac{23}{5}$

$\frac{11}{2}$

---

5. 📖 Rewrite the mixed numbers as improper fractions. Then, simplify before you multiply. Be sure to simplify your answers.

a. $2\frac{1}{4} \times 2\frac{2}{3} =$ _____

b. $1\frac{5}{6} \times 4\frac{2}{5} =$ _____

c. $3\frac{1}{2} \times 1\frac{3}{4} =$ _____

d. $4\frac{2}{7} \times 2\frac{1}{3} =$ _____

e. $1\frac{1}{3} \times 1\frac{3}{8} =$ _____

f. $3\frac{1}{3} \times 5\frac{2}{5} =$ _____

g. $5\frac{2}{7} \times 2\frac{6}{11} =$ _____

h. $10\frac{2}{5} \times 4\frac{3}{8} =$ _____

---

6. Choose the correct answer.

a. $7\frac{1}{2} \times \frac{1}{15} =$ _____

A. 2   B. $\frac{1}{2}$ C. $\frac{16}{17}$ D. $7\frac{1}{30}$

b. $1\frac{1}{4} \times 1\frac{1}{5} \times 1\frac{1}{6} =$ _____

A. $1\frac{3}{4}$ B. $1\frac{1}{120}$ C. $1\frac{1}{15}$ D. $1\frac{1}{5}$

c. $4\frac{2}{3} \times 1\frac{2}{7} =$ _____

A. $4\frac{4}{21}$ B. $5\frac{20}{21}$ C. $4\frac{2}{21}$ D. 6

d. $2\frac{1}{5} \times 0.5 \bigcirc \frac{11}{10}$

A. <   B. >   C. =

e. $1\frac{1}{3} \times 1\frac{2}{7}$ ◯ $2\frac{1}{7} - \frac{3}{7}$ A. <   B. >   C. =

f. $\frac{3}{8} \times 1\frac{3}{5}$ ◯ $\frac{3}{50}$ A. <   B. >   C. =

g. $2\frac{1}{3} \times \underline{\quad\quad} = 1$ A. $\frac{7}{3}$ B. $\frac{3}{7}$ C. $3\frac{1}{2}$ D. 6

h. Which of the following is not equal to $4 \times 5\frac{2}{3}$?

A. $5 \times 4\frac{2}{3}$ B. $\frac{68}{3}$ C. $\frac{4}{3} \times 17$ D. $\frac{17}{3} \times 4$

---

7. 📖 Ola and Omina were planting flowers in their garden. Ola had 2 bags of flower seeds, but Omina had only $\frac{3}{4}$ of a bag of seeds. Each girl planted $\frac{1}{2}$ of the seeds she had. **How many bags of seeds did they plant altogether ?**

Planting Seeds

---

8. 📖 Two students tried multiplying a mixed number by a fraction using the distributive property of multiplication. Look at their solutions. **Find and correct the errors.**

Given : $3\frac{5}{8} \times \frac{2}{3}$

Nabila's Solution	Basem's Solution
$3\frac{5}{8} \times \frac{2}{3}$ $\left(3 \times \frac{2}{3}\right) + \left(\frac{5}{8} \times \frac{2}{3}\right)$ $\frac{6}{3} + \frac{10}{24}$ $\frac{16}{27}$	$3\frac{5}{8} \times \frac{2}{3}$ $\left(3 \times \frac{2}{3}\right) \times \left(\frac{5}{8} \times \frac{2}{3}\right)$ $\frac{6}{3} \times \frac{10}{24}$ $\frac{60}{72} = \frac{5}{6}$

---

9. 📖 Ayman is taking inventory of his landscaping supplies. He has $3\frac{1}{2}$ bags of fertilizer. Each bag weighs $7\frac{3}{4}$ kilograms. He writes that there are $21\frac{3}{8}$ kg of fertilizer in all. **Is Ayman correct ? Explain your thinking.**

Fertilizer

Multiple Choice Questions

Choose the correct answer.

1. $4\frac{1}{2} \times 2\frac{2}{3} =$ _____

   A. 12 B. $8\frac{1}{3}$

   C. $5\frac{2}{3}$ D. $\frac{17}{6}$

2. $2\frac{5}{7} \times \frac{1}{5} = \left(2 \times \frac{1}{5}\right) + \left(\underline{\quad} \times \frac{1}{5}\right)$

   A. 2 B. $\frac{1}{5}$

   C. $\frac{5}{7}$ D. $\frac{19}{35}$

3. $4\frac{1}{4} \times \frac{3}{5} = \frac{\quad}{4} \times \frac{3}{5}$

   A. $\frac{1}{4}$ B. $\frac{4}{17}$

   C. 17 D. 4

4. $\frac{1}{8} \times 7\frac{5}{6}$ $\bigcirc$ 1

   A. > B. < C. =

5. $1\frac{1}{5} \times \underline{\quad} = 1$

   A. 5 B. $\frac{5}{4}$

   C. $\frac{5}{6}$ D. $\frac{6}{5}$

6. Which of the following is not equal to $8 \times 4\frac{1}{6}$?

   A. $8 \times \frac{25}{6}$ B. $\frac{8}{3} \times \frac{25}{2}$

   C. $\frac{100}{3}$ D. $4 \times 8\frac{1}{6}$

7. $3\frac{3}{4} \times 5\frac{1}{3} =$ _____

   A. 12 B. $15\frac{1}{4}$

   C. 20 D. 24

8. $\left(2 \times 3\right) + \left(2 \times \frac{5}{7}\right) + \left(\frac{1}{2} \times 3\right) + \left(\frac{1}{2} \times \frac{5}{7}\right)$ = _____

   A. $2\frac{5}{7} \times 3\frac{1}{2}$ B. $2\frac{1}{2} \times 3\frac{5}{7}$

   C. $3\frac{5}{7} \times 2\frac{5}{7}$ D. $2\frac{1}{2} \times 3\frac{1}{2}$

9. Which of the following represent $1\frac{1}{3} \times 1\frac{1}{2}$?

   A.   B.   C.   D.
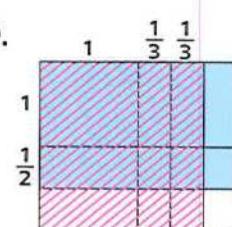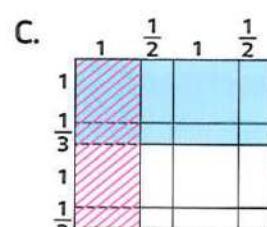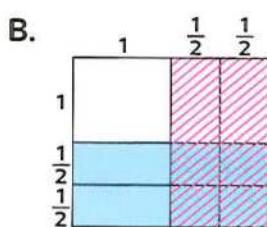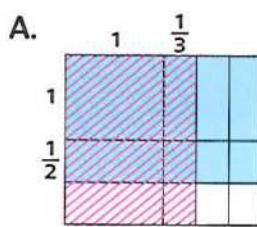
10. The opposite model represents _____

    A. $1\frac{1}{4} \times 1\frac{1}{2}$ B. $3\frac{1}{4} \times 1\frac{1}{2}$

    C. $3\frac{3}{4} \times 1\frac{1}{2}$ D. $3\frac{3}{4} \times \frac{1}{2}$

111
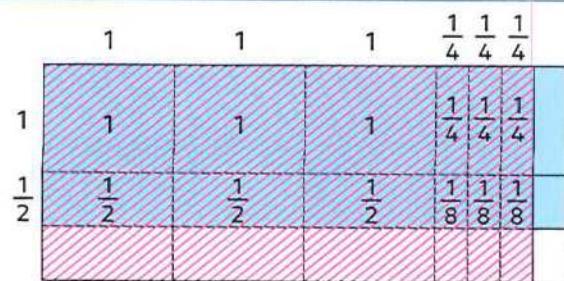
Story Problems Involving Multiplication of Fractions and Mixed Numbers

Example 1

Marvina purchased a bag of mango from the market that has a mass of $3\frac{1}{4}$ kilograms. Her sister Sandy purchased a bag of orange that has a mass of $1\frac{1}{2}$ times more than Marvina's bag of mango.

What is the mass of Sandy's bag of orange ?

Solution

Marvina has $3\frac{1}{4}$ kg

Sandy has $1\frac{1}{2}$ times more than Marvina.

Sandy has $1\frac{1}{2} \times 3\frac{1}{4} = \frac{3}{2} \times \frac{13}{4} = \frac{39}{8} = 4\frac{7}{8}$ kg

Example 2

Youssef is reading a book. He can usually read $5\frac{1}{2}$ pages in 1 hour. If he plans to read for 2 hours and 15 minutes.

How many pages will he read ?

Solution

Youssef read $5\frac{1}{2}$ pages in 1 hour.

and (2 hours and 15 minutes) equals $2\frac{1}{4}$ hours

, then the number of pages he will read

$= 5\frac{1}{2} \times 2\frac{1}{4} = \frac{11}{2} \times \frac{9}{4} = \frac{99}{8}$

$= 12\frac{3}{8}$ pages.

Note that

15 minutes $= \frac{1}{4}$ hour

30 minutes $= \frac{1}{2}$ hour

45 minutes $= \frac{3}{4}$ hour

Story Problems Involving Multiplication of Fractions and Mixed Numbers

1. 📖 Aya purchased a bag of tomatoes from the market that has a mass of $2\frac{1}{3}$ kilograms. Her brother, Ameen, purchased a bag of potatoes that has a mass $1\frac{1}{2}$ times more than Aya's bag of tomatoes. **What is the mass of Ameen's bag of potatoes ?**

_____

2. Nada is making spaghetti sauce.

   The recipe calls for $1\frac{3}{4}$ cups of water,

   she wants to make $4\frac{1}{2}$ times th recipe.

   How much water should she use ?

_____

3. 📖 Moustafa is harvesting sugarcane.

   He can harvest $3\frac{3}{4}$ kilograms of sugarcane

   in 1 hour. If he plans to work for $2\frac{1}{2}$ hours,

   How much sugarcane will he harvest ?

   sugarcane

_____

4. 📖 Seif bought 4 bags of soil for his garden.

   Each bag has a mass of $3\frac{1}{3}$ kilograms. If he only used $3\frac{3}{4}$ bags of soil,

   How many kilograms did he use ?

_____

5. Nagwa bought $2\frac{2}{3}$ liters of mango juice for $8\frac{3}{8}$ L.E. for each liter.
   How much money did she pay ?

_____

6. A mother is $1\frac{3}{8}$ times as tall as her daughter.

The girl is $1\frac{1}{3}$ times as tall as her brother.

How many times the mother is as tall as her son ?

_____

7. 📖 Farida is reading a chapter book. She can usually read $20\frac{1}{2}$ pages in 1 hour. If she plans to read for 1 hour and 15 minutes, **how many pages will she read ?**

_____

8. Giovanni earns $7\frac{1}{2}$ L.E. for an hour. He works

4 hours and 40 minutes per day, 5 days per week.

How much money does he earn per day ?

How much money does he earn in 2 weeks ?

_____

_____

9. 📖 **Time for a Story.** Write a multiplication story problem using each given pair of mixed numbers. Share your problem with a partner, and then solve your partner's problem. Be sure to simplify your answers, if possible.

a. $12\frac{1}{2}$ and $3\frac{2}{3}$ | **b.** $1\frac{4}{5}$ and $\frac{2}{3}$ | **c.** $5\frac{3}{4}$ and $1\frac{1}{5}$

_____

_____

_____

Dividing Whole Numbers and Unit Fractions

Fast Fact

Newborn babies spend **16** hours in a day sleeping.

What is the fraction represents the number of sleeping hours daily ?

Lesson No.	Lesson Name	Learning Objectives
Lessons 9 & 10	Fractions as Division	• Students will explain how fractions represent division of whole numbers.
	Story Problems Involving Fractions as Division	• Students will solve story problems involving division of whole numbers and quotients of fractions or mixed numbers. • Students will simplify fractions and mixed numbers.
Lessons 11 & 12	Dividing Unit Fractions by Whole Numbers	• Students will use models to divide unit fractions by whole numbers. • Students will explain the relationship between division and multiplication of fractions.
	Dividing Whole Numbers by Unit Fractions	• Students will use models to divide whole numbers by unit fractions. • Students will apply the relationship between division and multiplication of fractions to solve problems.
Lesson 13	Story Problems Involving Division of Whole Numbers and Unit Fractions	• Students will solve story problems involving division of whole numbers and unit fractions. • Students will simplify fractions and mixed numbers.

- **Fractions as Division**
- **Story Problems Involving Fractions as Division**

Learn Fractions as division

- If you distribute 2 watermelons among 5 boys

, then each boy has $2 \div 5$ or $\dfrac{2}{5}$
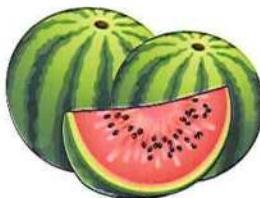
Using model to find quotient

2 watermelon ÷ **5** boys

| 1 | 2 | 3 | 4 | 5 |

$\dfrac{1}{5}\ \dfrac{1}{5}\ \dfrac{1}{5}\ \dfrac{1}{5}\ \dfrac{1}{5}$

| 1 | 2 | 3 | 4 | 5 |

$\dfrac{1}{5}\ \dfrac{1}{5}\ \dfrac{1}{5}\ \dfrac{1}{5}\ \dfrac{1}{5}$

$\dfrac{2}{5}$
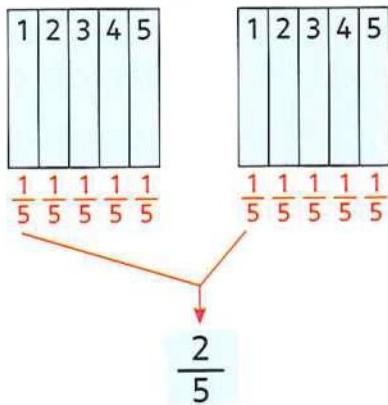
Note that

$2 \div 5$ means $\dfrac{2}{5}$

- The dividend (2) is the numerator
- The divisor (5) is the denominator
- The division symbol (÷) is the fraction bar, then fractions can represent division.

- If you distribute 4 liters of milk among 3 girls

, then each girl has $4 \div 3$ or $\dfrac{4}{3}$ liter

Using model to find quotient

4 liters ÷ **3** girls

| 1 | 2 | 3 | | 1 | 2 | 3 | | 1 | 2 | 3 | | 1 | 2 | 3 |

$\dfrac{1}{3}\ \dfrac{1}{3}\ \dfrac{1}{3}\quad \dfrac{1}{3}\ \dfrac{1}{3}\ \dfrac{1}{3}\quad \dfrac{1}{3}\ \dfrac{1}{3}\ \dfrac{1}{3}\quad \dfrac{1}{3}\ \dfrac{1}{3}\ \dfrac{1}{3}$

$\dfrac{4}{3}$
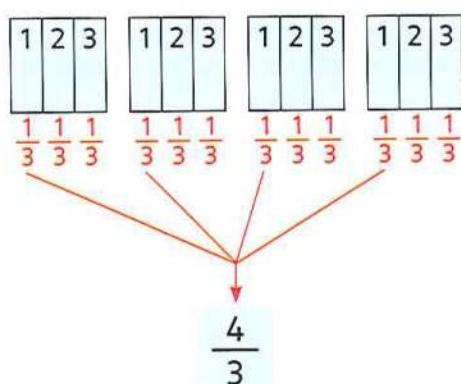
Division algorithm

$$3 \overline{\smash{)}\ 4} \quad 1\tfrac{1}{3}$$
$$\underline{-3}$$
$$1$$

$4 \div 3 = \dfrac{4}{3} = 1\dfrac{1}{3}$

(quotient as a mixed number)

Example 1

Write the division expression that represents each of the following situations and write the quotient as a mixed number (using division algorithm).

a. Divide 7 oranges between 2 students.

b. Distribute 7 apples among 4 students.

Solution

a. The division expression : $7 \div 2$

$$7 \div 2 = \frac{7}{2} = 3\frac{1}{2}$$

$$\begin{array}{r} 3\frac{1}{2} \\ 2\overline{\smash{)}\,7} \\ -6 \\ \hline 1 \end{array}$$

b. The division expression : $7 \div 4$

$$7 \div 4 = \frac{7}{4} = 1\frac{3}{4}$$

$$\begin{array}{r} 1\frac{3}{4} \\ 4\overline{\smash{)}\,7} \\ -4 \\ \hline 3 \end{array}$$

Example 2

If the price of 12 pens is 32 L.E. Find the price of each pen.

Solution

Price of each pen $= 32 \div 12 = \frac{32}{12} = \frac{8}{3} = 2\frac{2}{3}$ L.E.

✓ Check your understanding

Divide 13 pizzas among 4 girls, what is the share of each girl ?

• **Fractions as Division**

• **Story Problems Involving Fractions as Division**

● REMEMBER   ● UNDERSTAND   ● APPLY   ●● PROBLEM SOLVING   📖 From the school book

1. 📖 Match each situation with the division expression that represents it.

Using graph paper or the Whiteboard, create a model that represents each scenario.

Then find the quotient. Simplify your answer, if possible.

1. 2 bales of cotton shared by 3 manufacturers.

2. 3 bales of cotton shared by 2 manufacturers.

3. 5 bales of cotton shared by 2 manufacturers.

4. 3 bales of cotton shared by 5 manufacturers.

5. 2 bales of cotton shared by 4 manufacturers.

6. 2 bales of cotton shared by 5 manufacturers.

A. $4 \div 2$

B. $2 \div 5$

C. $2 \div 3$

D. $3 \div 2$

E. $5 \div 3$

F. $2 \div 4$

G. $5 \div 2$

H. $3 \div 5$

2. 📖 Complete the chart. Write the quotient as a mixed number and simplify, if possible.

Then, use the division algorithm and write the remainder as a fraction.

Expression	Quotient	Division algorithm
Example: $6 \div 5$	$\frac{6}{5} = 1\frac{1}{5}$	$\begin{array}{r} 1\frac{1}{5} \\ 5\overline{)6} \\ -5 \\ \hline 1 \end{array}$
a. $8 \div 5$		
b. $4 \div 3$		
c. $6 \div 3$		
d. $5 \div 4$		
e. $3 \div 2$		

3. The price of 8 pens is 12 L.E.

Find the price of each pen.

_____

4. Divide 3 pizzas among 5 persons equally,

what is the share of each person?

_____

5. If you want to distribute 22 liters of oil in 6 small bottles equally,

find the volume of oil in each bottles?

_____

6. 3 persons shared a taxi fare equally, if they paid total 28 L.E.

How much money did each of them pay?

_____

7. 📖 Sameh ran 10 kilometers in 70 minutes. How many kilometers per minute did he run?

_____

8. 📖 Shehab has 6 houseplants. It took him 45 minutes to replant them. How long did it take

him to replant each one?

_____

9. 📖 The flower shop received 8 equal-sized bundles of chrysanthemums and 10 vases.

If the bundles are divided equally among 10 vases, what part of a bundle will each

vase get?

_____

10. 📖 The flower shop has 12 meters of ribbon to make equal-sized bows for each of the

8 birthday bouquets they are making. How many meters of ribbon can be used for

each bouquet?

_____

11. 📖 The flower shop needs to care for 8 rose bouquets. They have 5 packets of flower food. If they want to share the food equally among the bouquets, **what part of a packet of food will each bouquet receive?**

_____

12. 📖 The flower shop wants to make 3 identical centerpieces. If they have 5 bunches of flowers, **how many bunches of flowers can they use for each centerpiece?**

_____

13. 📖 There are 4 palm trees behind the shop. If the shop has 15 liters of water, **how many liters of water can each tree receive?**

_____

14. 📖 Nadia wants to make a dress for each of her 4 dolls. She has 6 meters of fabric. She is confused about whether she can use $\frac{2}{3}$ m of fabric for each dress or $1\frac{1}{2}$ m of fabric for each dress. If she wants to use all fabric. **Use numbers, words, or pictures to help explain how much fabric Nadia can use for each dress.**

_____

15. A school trip to the zoo consists of 4 teachers and 18 students, if the total of what the teachers paid is 30 L.E. and the total of what the students paid is 45 L.E. **Find the price of the adult ticket and the price of the student ticket.**

_____

16. 📖 **Write your own division story problems using two of the numbers for each problem. then, write an equation to solve each problem.**

| 4 | 7 | 28 |

1. Write a story problem in which the quotient is a whole number.

_____

2. Write a story problem in which the quotient is a fraction less than 1.

_____

3. Write a story problem in which the quotient is a mixed number.

Choose the correct answer.

1. $12 \div 5$ equals each of the following except ———

A. $\frac{5}{12}$
B. $\frac{12}{5}$
C. $2\frac{2}{5}$
D. $2 + \frac{2}{5}$

2. The missing fraction on the opposite division algorithm is ———

$$2\frac{\quad}{\quad}$$
$$5\overline{)\begin{array}{r}14\\-10\\\hline 4\end{array}}$$

A. $\frac{4}{14}$
B. $\frac{4}{5}$
C. $\frac{5}{4}$
D. $\frac{7}{2}$

3. If we divide 7 oranges among 5 persons, then each person has ——— orange.

A. $\frac{5}{7}$
B. $1\frac{1}{5}$
C. $2\frac{1}{5}$
D. $1\frac{2}{5}$

4. $6\frac{1}{2} =$ ——— $\div 2$

A. 11
B. 12
C. 13
D. 14

5. All the following expressions equal each other except ———

A. $22 \div 7$
B. $7 \div 22$
C. $3\frac{1}{7}$
D. $\frac{22}{7}$

6. If Sandy bought 5 kg of meat and wanted to divided it into 4 equally meals, then the number of kilograms in each meal = ——— kg

A. $1\frac{1}{2}$
B. $1\frac{1}{4}$
C. $1\frac{3}{4}$
D. $1\frac{1}{8}$

7. $12 \div 8 = 1\frac{1}{\quad}$

A. 2
B. 3
C. 4
D. 5

8. $14 \div 5 =$ ——— $+ 2$

A. $\frac{2}{5}$
B. $\frac{3}{5}$
C. $\frac{4}{5}$
D. $\frac{1}{5}$

- **Dividing Unit Fractions by Whole Numbers**
- **Dividing Whole Numbers by Unit Fractions**

Learn Dividing unit fractions by whole numbers

- Unit fraction is a fraction with 1 as the numerator.

To evaluate : $\frac{1}{3} \div 4$

Rewrite the problem from division to multiplication :

$$\frac{1}{3} \div 4 = \frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$$

- **Using area model**

| $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ |

| $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ | $\frac{1}{12}$ |

$$\frac{1}{3} \div 4 = \frac{1}{12}$$

> **Note that**
>
> Dividing $\frac{1}{3}$ by 4
>
> means $\frac{1}{4}$ of $\frac{1}{3}$
>
> means $\frac{1}{4} \times \frac{1}{3}$

To evaluate : $4 \div \frac{1}{3}$

Rewrite the problem from division to multiplication

$$4 \div \frac{1}{3} = 4 \times 3 = 12$$

Using area model

| 1 | | | 2 | | | 3 | | | 4 | | |
| $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{3}$ |

There are 12 groups of $\frac{1}{3}$ in 4, then $4 \div \frac{1}{3} = 12$

> **Note**
>
> Each of the 4 wholes is 3 thirds which is the same as 4×3

Example 1

Using area model to evaluate each of the following.

a. $\frac{1}{5} \div 2$

b. $\frac{1}{2} \div 7$

c. $3 \div \frac{1}{4}$

d. $6 \div \frac{1}{3}$

Solution

a.

$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$

$\frac{1}{10}$ $\frac{1}{10}$

$\frac{1}{5} \div 2 = \frac{1}{5} \times \frac{1}{2} = \frac{1}{10}$

b.

$\frac{1}{2}$	$\frac{1}{2}$

$\frac{1}{14}$ $\frac{1}{14}$ $\frac{1}{14}$ $\frac{1}{14}$ $\frac{1}{14}$ $\frac{1}{14}$ $\frac{1}{14}$

$\frac{1}{2} \div 7 = \frac{1}{2} \times \frac{1}{7} = \frac{1}{14}$

c.

1	2	3

$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

$3 \div \frac{1}{4} = 3 \times 4 = 12$

d.

1	2	3	4	5	6

$\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$

$6 \div \frac{1}{3} = 6 \times 3 = 18$

Remark

• The relation between multiplication and division

If $3 \times \frac{1}{3} = 1$, then $1 \div 3 = \frac{1}{3}$ and $1 \div \frac{1}{3} = 3$

123

Example 2

Find the quotient of each of the following.

a. $\frac{1}{7} \div 3$

b. $\frac{1}{2} \div 4$

c. $\frac{1}{4} \div 4$

d. $1 \div \frac{1}{5}$

e. $3 \div \frac{1}{3}$

f. $6 \div \frac{1}{5}$

Solution

a. $\frac{1}{7} \div 3 = \frac{1}{7} \times \frac{1}{3} = \frac{1}{21}$

b. $\frac{1}{2} \div 4 = \frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$

c. $\frac{1}{4} \div 4 = \frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$

d. $1 \div \frac{1}{5} = 1 \times 5 = 5$

e. $3 \div \frac{1}{3} = 3 \times 3 = 9$

f. $6 \div \frac{1}{5} = 6 \times 5 = 30$

Example 3

How many halves are there in 3 apples ?

Solution

To find the number of halves in 3 apples :

Divide each apple into 2 equal parts as in the following figure :
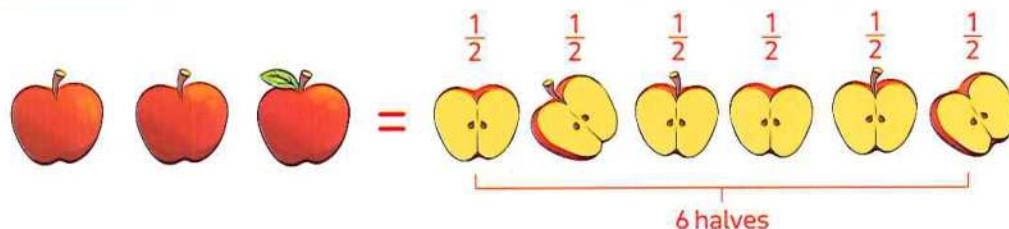
We can find the number of halves in 3 apples by dividing as follows : $3 \div \frac{1}{2} = 3 \times 2 = 6$ halves

Check your understanding

1. Evaluate each of the following using area model.

   a. $\frac{1}{4} \div 3$

   b. $2 \div \frac{1}{3}$

2. Find the quotient of each of the following.

   a. $5 \div \frac{1}{2} = $

   b. $7 \div \frac{1}{4} = $

   c. $\frac{1}{3} \div 6 = $

   d. $\frac{1}{6} \div 4 = $

- **Dividing Unit Fractions by Whole Numbers**
- **Dividing Whole Numbers by Unit Fractions**

● REMEMBER   ● UNDERSTAND   ○ APPLY   ⚬ PROBLEM SOLVING   📖 From the school book

1. 📖 Using area models to dividing unit fractions and whole numbers to find the quotient.

a. $\frac{1}{3} \div 5 =$

b. $\frac{1}{2} \div 7 =$

c. $\frac{1}{2} \div 3 =$

d. $\frac{1}{8} \div 2 =$

e. $\frac{1}{3} \div 2 =$

f. $\frac{1}{6} \div 3 =$

g. $\frac{1}{3} \div 4 =$

h. $\frac{1}{5} \div 5 =$

i. $4 \div \frac{1}{3} =$

j. $3 \div \frac{1}{4} =$

k. $3 \div \frac{1}{5} =$

l. $4 \div \frac{1}{5} =$

m. $5 \div \frac{1}{2} =$

n. $8 \div \frac{1}{2} =$

o. $2 \div \frac{1}{4} =$

p. $6 \div \frac{1}{3} =$

2. Evaluate each of the following.

a. $\frac{1}{2} \div 12$

b. $\frac{1}{7} \div 5$

c. $\frac{1}{8} \div 3$

d. $\frac{1}{3} \div 7$

e. $\frac{1}{5} \div 8$

f. $\frac{1}{9} \div 4$

g. $\frac{1}{9} \div 8$

h. $\frac{1}{10} \div 2$

i. $\frac{1}{12} \div 3$

j. $7 \div \frac{1}{6}$

k. $9 \div \frac{1}{2}$

l. $10 \div \frac{1}{5}$

m. $3 \div \frac{1}{9}$

n. $12 \div \frac{1}{10}$

o. $15 \div \frac{1}{2}$

p. $16 \div \frac{1}{5}$

q. $16 \div \frac{1}{4}$

r. $100 \div \frac{1}{3}$

3. 📖 Write the missing number in each equation.

a. $\frac{1}{3} \div a = \frac{1}{12}$ $\frac{1}{3} \times b = \frac{1}{12}$ a = ——   b = ——

b. $\frac{1}{4} \div c = \frac{1}{20}$ $\frac{1}{4} \times d = \frac{1}{20}$ c = ——   d = ——

c. $\frac{1}{5} \div e = \frac{1}{30}$ $\frac{1}{5} \times f = \frac{1}{30}$ e = ——   f = ——

d. $\frac{1}{8} \div g = \frac{1}{24}$ $\frac{1}{8} \times h = \frac{1}{24}$ g = ——   h = ——

e. $\frac{1}{2} \times j = \frac{1}{14}$ $\frac{1}{2} \div k = \frac{1}{14}$ j = ——   k = ——

f. $\frac{1}{7} \times m = \frac{1}{21}$ $\frac{1}{7} \div n = \frac{1}{21}$ m = ——   n = ——

g. $\frac{1}{6} \div p = \frac{1}{12}$ $\frac{1}{6} \times q = \frac{1}{12}$ p = ——   q = ——

h. $\frac{1}{10} \times r = \frac{1}{40}$ $\frac{1}{10} \div s = \frac{1}{40}$ r = ——   s = ——

i. $5 \div a = 15$ $5 \times b = 15$ a = ——   b = ——

j. $8 \div c = 32$ $8 \times d = 32$ c = ——   d = ——

k. $3 \times f = 6$ $3 \div g = 6$ f = ——   g = ——

l. $6 \div h = 30$ $6 \times j = 30$ h = ——   j = ——

m. $8 \times k = 24$ $8 \div m = 24$ k = ——   m = ——

n. $7 \div n = 35$ $7 \times p = 35$ n = ——   p = ——

o. $3 \times q = 57$ $3 \div r = 57$ q = ——   r = ——

p. $9 \div s = 126$ $9 \times t = 126$ s = ——   t = ——

4. Answer the following questions.

a. How many halves are there in 7 ?

b. How many fifths are there in 8 ?

c. How many quarters are there in 6 ?

d. How many sixths are there in 10 ?

Choose the correct answer.

1. $3 \div \frac{1}{3}$ ◯ 8

    A. >   B. <   C. =

2. If $\frac{1}{2} \div m = \frac{1}{16}$, then m = _____

    A. 8   B. $\frac{1}{8}$

    C. 14   D. $\frac{1}{14}$

3. If $7 \div a = 35$, then a = _____

    A. 5   B. $\frac{1}{5}$

    C. 28   D. $\frac{1}{7}$

4. $4 \div \frac{1}{5} =$ _____

    A. $\frac{4}{5}$ B. $\frac{1}{20}$

    C. 20   D. $\frac{5}{4}$

5. $\frac{1}{3} \div 5$ ◯ $\frac{1}{5} - \frac{2}{15}$

    A. >   B. <   C. =

6. How many thirds are there in 9?

    A. 18   B. 27

    C. 36   D. 24

7. $13 \div \frac{1}{4} =$ _____

    A. $\frac{13}{4}$ B. $\frac{1}{52}$

    C. 17   D. 52

8. $5 \div \frac{1}{4}$ ◯ $4 \div \frac{1}{5}$

    A. >   B. <   C. =

9. The opposite area model represents _____

$\frac{1}{3}$		$\frac{1}{3}$		$\frac{1}{3}$	
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

    A. $\frac{1}{3} \div \frac{1}{6}$ B. $\frac{1}{3} \div 2$

    C. $\frac{1}{3} \div \frac{1}{2}$ D. $\frac{1}{2} \times 3$

10. The opposite area model represents _____

$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$	
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$

    A. $\frac{1}{5} \div \frac{1}{10}$ B. $\frac{1}{5} \div 2$

    C. $\frac{1}{5} \div \frac{1}{2}$ D. $\frac{1}{10} \div \frac{1}{5}$

Story Problems Involving Division of Whole Numbers and Unit Fractions

Learn What is the difference between $5 \div \frac{1}{3}$ and $\frac{1}{3} \div 5$?

- In $5 \div \frac{1}{3}$ you need to find how many groups of $\frac{1}{3}$ are in 5

So, $5 \div \frac{1}{3} = 15$

- In $\frac{1}{3} \div 5$ you need to divide $\frac{1}{3}$ into 5 equal groups and determine how much is in one of those groups.

So, $\frac{1}{3} \div 5 = \frac{1}{15}$

Example 1

You plan to make a pizza party for your group of friends when half a pizza is divided into 3 equal parts, **how much does each person get of a whole pizza ?**

Solution

Each person have $= \frac{1}{2} \div 3 = \frac{1}{2} \times \frac{1}{3}$

$\qquad\qquad = \frac{1}{6}$ of pizza

Example 2

A computer takes $\frac{1}{300}$ of a second to complete a math problem.

How many math problems can the computer answer in 90 seconds ?

Solution

The number of problems $= 90 \div \frac{1}{300}$

$\qquad\qquad\qquad\qquad = 27{,}000$ problems

✔ **Check** your understanding

1. How many $\frac{1}{3}$ cup servings are in 5 cups of chocolate ?

   _____

   _____

2. Four students sitting at a table were given $\frac{1}{3}$ of a pan of brownies to share. How much of a pan will each student get if they share the pan of brownies equally ?

   _____

   _____

Story Problems Involving Division of Whole Numbers and Unit Fractions

● REMEMBER   ● UNDERSTAND   ● APPLY   ●● PROBLEM SOLVING   📖 From the school book

1. 📖 For each problem, identify which operation (addition, subtraction, multiplication, or division) should be used to model the situation described.

   a. There are 4 kilograms of hummus. A worker separates the hummus into packages of $\frac{1}{4}$ kg. How many packages will be made ?

   b. There are 4 bags of fava beans. Each bag has a mass of $\frac{3}{4}$ of a kilogram. What is the total mass of the fava beans ?

   c. Gehad mixes $\frac{1}{2}$ liter of blue paint with $\frac{3}{8}$ litre of red paint to make a shade of purple paint. How many liters of purple paint does Gehad make ?

   d. Fatma feeds her cat $\frac{1}{8}$ of a kilogram of cat food each day. How many days will 4 kg of cat food last ?

   e. Manal has $2\frac{1}{2}$ hours to complete her schoolwork. She finishes her math in $\frac{3}{4}$ of an hour. How much time remains for the rest of her schoolwork ?

   f. After the party, $\frac{1}{5}$ of the food remains. Hoda gives $\frac{1}{2}$ of the remaining food to her aunt. What fraction of the total amount of food did her aunt receive ?

   g. Nader has 8 liters of fruit juice. If he drinks $\frac{1}{4}$ L of juice each day, how many days will it take him to finish all the juice ?

   h. The factory's staff is $\frac{5}{8}$ female. How much of the staff is male ?

2. 📖 Read the given problems and compare the operation needed for each, identifying the values and their meanings. Then, apply your strategies to solve both problems.

   a. On Tuesday morning, Farha's Flower Shop made 7 bouquets of daffodils which were $\frac{1}{5}$ of the number of bouquets ordered for that day. How many total bouquets were ordered from Farha's Flower Shop on Tuesday ?

   b. Aya's Floral Shop has 7 liters of special water to use for bouquets of myrtles. Each bouquet requires $\frac{1}{5}$ of a liter of the special water. How many bouquets can Aya's Floral Shop make ?

3. I took ten minutes to answer one-quarter of the questions on my mathematics test.
   How long will i take to answer all the questions on my mathematics test ?

4. A Walmart employee is a shelf stacker. His time for stacking a shelve is $\frac{1}{3}$ hour for a shelf. If he is at work for 8 hours. **How many shelves will he be able to fill ?**

5. You have 24 big yo-yos that you would like to paint green. Each yo-yo takes half a cup to paint. You have 8 cubs of paint. **How many yo-yos can you paint ? then find the number of yo-yos that not painting.**

6. 📖 **Select the expression that represents the problem, and then evaluate it.**

a. If a turtle can crawl $\frac{1}{2}$ kilometers per hour, how many hours would it take for the turtle to travel 8 km ?

Choose : $\frac{1}{2} \div 8$ or $8 \div \frac{1}{2}$

b. A teacher wants to give $\frac{1}{8}$ of a box of pencils to each student. She has 5 boxes of pencils. To how many students will she be able to give pencils ?

Choose : $\frac{1}{8} \div 5$ or $5 \div \frac{1}{8}$

c. Abdallah has 3 identical gifts to wrap. He uses $\frac{1}{2}$ of a roll of paper to wrap the gifts. If each gift uses the same amount of paper, how much paper did Abdallah use for each gift ?

Choose : $\frac{1}{2} \div 3$ or $3 \div \frac{1}{2}$

d. Afaf and Adel pulled up weeds in $\frac{1}{6}$ of the garden's area. If they divided the weeding equally, what total area of the garden did Afaf weed ?

Choose : $\frac{1}{6} \div 2$ or $2 \div \frac{1}{6}$

e. A toddler eats $\frac{1}{3}$ of a piece of bread each day for breakfast. If the loaf of bread contains 12 pieces, how many days of breakfast will the loaf of bread provide ?

Choose : $\frac{1}{3} \div 12$ or $12 \div \frac{1}{3}$

f. A computer takes $\frac{1}{200}$ of a second to complete a math problem. How many math problems can the computer answer in 120 seconds ?

Choose : $\frac{1}{200} \div 120$ or $120 \div \frac{1}{200}$

g. A box of dry milk powder contains 15 servings. The box of milk powder weighs $\frac{1}{2}$ of a kilogram. What is the weight of each serving of dry milk powder ?

Choose : $\frac{1}{2} \div 15$ or $15 \div \frac{1}{2}$

h. It takes Aya $\frac{1}{3}$ of an hour to model 4 identical clay figures. How long does it take for Aya to model one clay figure ? Choose : $\frac{1}{3} \div 4$ or $4 \div \frac{1}{3}$

1. Choose the correct answer.

a. $\frac{1}{6} \div 3 \bigcirc \frac{1}{6} - \frac{1}{9}$

   A. $>$ B. $<$ C. $=$

b. $2\frac{3}{4} \times$ ——— $= 1$

   A. $\frac{4}{11}$ B. $\frac{11}{4}$ C. 4 D. $\frac{4}{3}$

c. $[4 \times 2] + [4 \times \frac{2}{7}] + [\frac{1}{3} \times 2] + [\frac{1}{3} \times \frac{2}{7}] =$ ———

   A. $4\frac{2}{7} \times 2\frac{1}{3}$ B. $4\frac{1}{3} \times 2\frac{2}{7}$ C. $3\frac{1}{4} \times 2\frac{2}{7}$ D. $4\frac{3}{7} \times 3\frac{2}{3}$

d. $0.25 \times \frac{6}{7} =$ ———

   A. $\frac{1}{14}$ B. $\frac{1}{7}$ C. $\frac{3}{14}$ D. $\frac{2}{7}$

e. The opposite model represents ———

   A. $\frac{2}{5} \times \frac{7}{6}$ B. $\frac{2}{7} \times \frac{5}{6}$

   C. $\frac{2}{5} \times \frac{3}{7}$ D. $\frac{3}{5} \times \frac{6}{7}$

f. $2\frac{2}{3} \times \frac{3}{5} =$ ———

   A. $\frac{5}{8}$ B. $1\frac{3}{5}$ C. $1\frac{8}{15}$ D. $2\frac{6}{15}$

g. $7 \div \frac{1}{2} =$ ———

   A. $3\frac{1}{2}$ B. 3 C. 14 D. 16

2. Complete.

a. $\frac{3}{—} \times \frac{5}{8} = \frac{15}{56}$

b. If $9 \div K = 126$, then $K =$ ———

c. $\frac{3}{4} - \frac{5}{8} =$ ——— $\div 4$

d. $25 \div 6 = 2\frac{1}{2} \times 1\frac{—}{3}$

e. $\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \frac{5}{6} \times \frac{6}{7} =$ ———

f. If $\frac{1}{3} \div m = \frac{1}{12}$, then $m =$ ———

g. $3 \div \frac{1}{5} =$ ———

h. $\frac{2}{5} \times 2\frac{1}{2} =$ ———

3. Choose the correct answer.

a. $7\frac{1}{7} \times \frac{9}{8} \bigcirc 7\frac{1}{7}$

    A. >   **B.** <   **C.** =

b. If $\frac{6}{23} \times a = \frac{6}{23} + \frac{6}{23} + \frac{3}{23}$, then a = ——

    A. $1\frac{1}{2}$ **B.** 2   **C.** $2\frac{1}{2}$ **D.** 3

c. If $6 \div h = 30$, then h = ——

    A. $\frac{1}{5}$ **B.** 180   **C.** 5   **D.** 90

d. $3 \times \frac{1}{3} \bigcirc 3 \div \frac{1}{3}$

    A. >   **B.** <   **C.** =

e. $1\frac{1}{3} \times 1\frac{1}{4} =$ ——

    A. $1\frac{2}{3}$ **B.** $2\frac{1}{7}$ **C.** $2\frac{1}{12}$ **D.** $1\frac{1}{12}$

f. $\frac{1}{7} \times m = \frac{1}{21}$, then m = ——

    A. $\frac{1}{7}$ **B.** $\frac{1}{21}$ **C.** $\frac{1}{3}$ **D.** $\frac{1}{147}$

g. $\frac{5}{3} \times 21 \times \frac{2}{7} =$ ——

    A. $\frac{24}{35}$ **B.** $\frac{21}{21}$ **C.** 1   **D.** 10

4. Answer the following.

a. Sandy eats $\frac{1}{3}$ of a piece of bread each day for breakfast. If the loaf of bread contains 9 pieces.
How many days of breakfast will the loaf of bread provide ?

b. Mariam is reading a chapter book. She can usually read $7\frac{1}{3}$ pages in one hour. If she plans to read for two hours and 15 minutes.
How many pages will she read ?

c. A teacher wants to give $\frac{1}{4}$ of a box pencils to each student. He has 6 boxes of pencils.
To how many students will he be able to give pencils ?

d. Write the result in its simplest form.

    1. $\frac{3}{5} \times 1.5$ **2.** $\frac{1}{5} \div 4$ **3.** $2\frac{1}{2} \times 4\frac{2}{5}$ **4.** $3 \div \frac{1}{8}$

Theme 4 | **Applications of Geometry and Measurement**

Two-Dimensional Plane Figures and Coordinate Planes

UNIT **10**

» **Concept 1 :** Investigating Attributes of Shapes
» **Concept 2 :** Coordinate Planes

Did You Know?!

Honeybees store their honey in the small cells in the shape of *hexagons*.

Investigating Attributes of Shapes

Lesson No.	Lesson Name	Lesson Objectives
Lesson 1	Categories of Shapes	• Students will classify two-dimensional figures into categories based on their attributes. • Students will classify two-dimensional figures into categories and subcategories based on their attributes. • Students will explain how two figures can belong to more than one subcategory.
Lesson 2	Tricky Triangles	• Students will measure the sides of triangles. • Students will categorize triangles based on their properties.
Lessons 3 to 5	Using Tiling to Calculate Area	• Students will use tiling to find the area of rectangles with whole number and fractional dimensions.
	Calculating Area with Fractional Dimensions	• Students will draw models to find the area of rectangles with whole-number and fractional dimensions.
	Applying the Area Formula	• Students will multiply to find the area of rectangles with whole-number and fractional dimensions.

Categories of Shapes

Parallel lines	Perpendicular lines	Intersecting lines
Right angle	**Acute angle**	**Obtuse angle**
A polygon	**Triangle**	**A quadrilateral**
A parallelogram	**Pentagon**	**Hexagon**

✅ **Check** your understanding

1. Write the type of each angle.

a.   b.   c.

_____   _____   _____
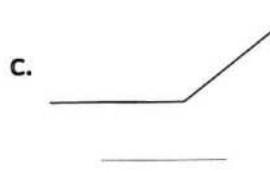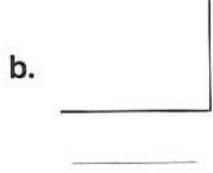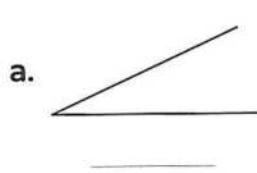
2. Write the relation between 2- straight lines.

a.   b.   c.

_____   _____   _____
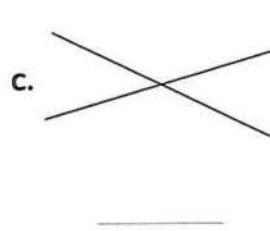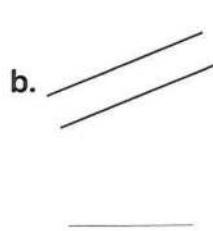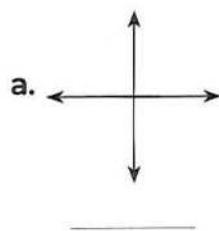
Learn   Quadrilateral

Quadrilateral is a polygon with four sides.

You will study some quadrilaterals as the following.
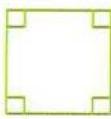
square
All sides have the same length, the four angles are right.

Rectangle
The opposite sides are parallel and have the same length, the four angles are right.

Remember
• Parallel lines do not meet.
• Right angles form square corners.

Some quadrilaterals do not have four right angles.

Parallelogram
It has two pairs of parallel sides.
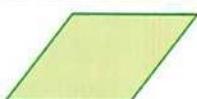
Rhombus
It has two pairs of parallel sides, 2 acute and 2 obtuse angles. It has four congruent sides.

Trapezoid or Trapezium
It has only one pair of parallel sides.

Kite
Each two pairs of adjacent sides are congruent.

Note that
• All of square, rectangle and rhombus are a parallelogram because they all have both pairs of opposite sides parallel.
• The subcategory between square and rectangle, they have 4 right angles.
• The subcategory between square and rhombus, they have 4 sides equal in length.

Example

Choose the quadrilaterals match the descriptions below.

A.   B.   C.

D.   E.
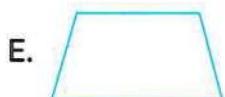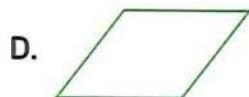
a. Which of the figures have four right angles ? _____
b. Which of the figures have four sides of the same length ? _____
c. Which shapes are parallelograms ? Why ? _____

Solution

a. A , C

b. A , D

c. A , B , C , D

They all have two pairs of opposite parallel sides.

Summary

Quadrilateral
(4-sided polygon)

Trapezoid

Exactly 1-pair of parallel sides

Parallelogram

2 pairs of parallel sides opposite each other

Kite

2 pairs of adjacent sides that are congruent

Rectangle

4 right angles

Rhombus

2 acute angles and 2 obtuse with four congruent sides

Square

4 right angles
4 congruent sides
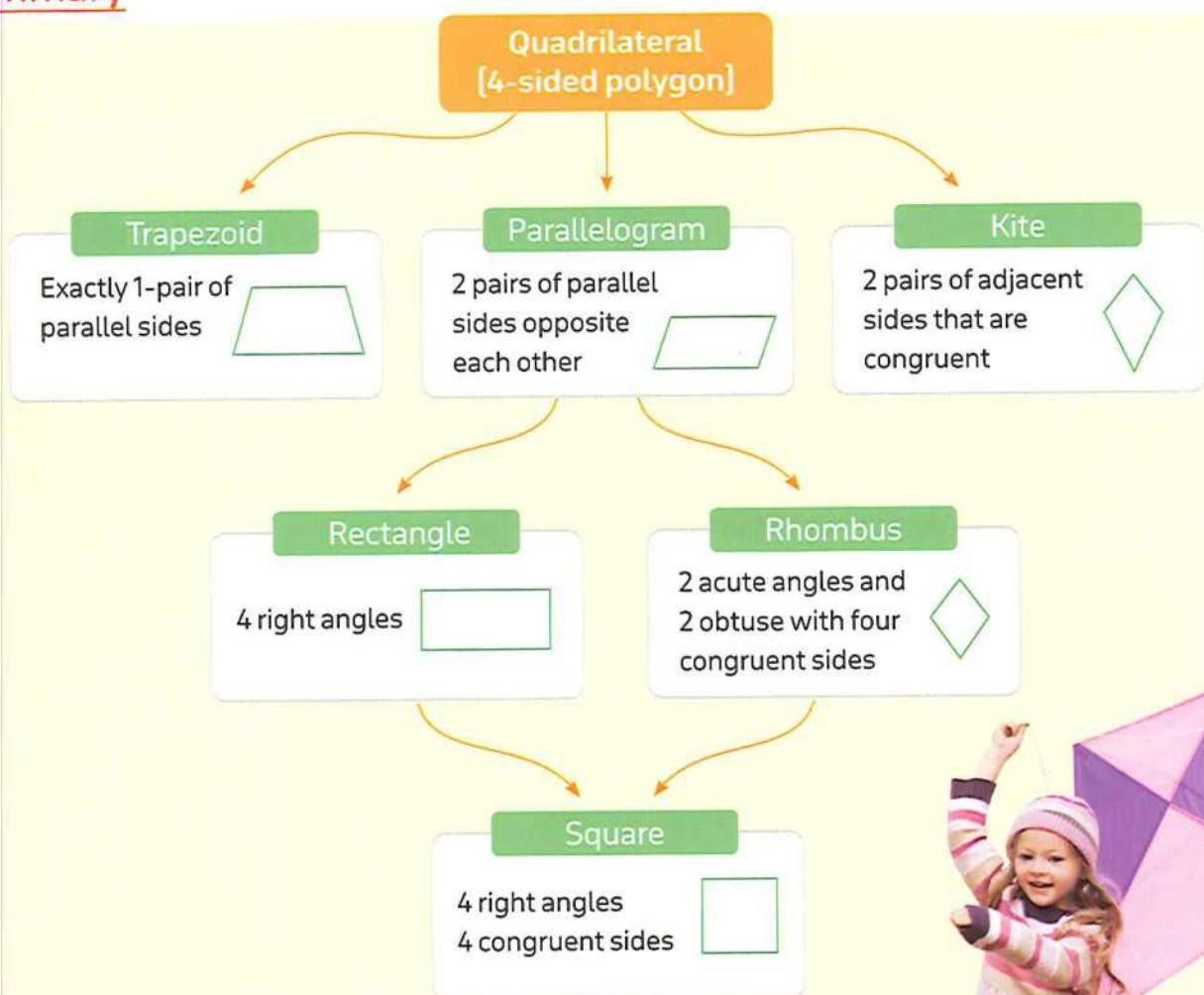
- The parallelogram with right angle is called **rectangle**.
- The parallelogram with four congruent sides is called **rhombus**.
- The rectangle with 4-sides equal in length is called **square**.
- The rhombus with 4 right angles is called **square**.

✓ Check your understanding

Write the name that best describes each figure.
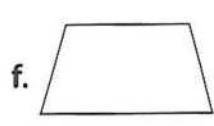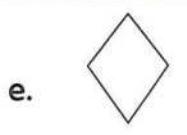
a.

b.

c.

d.

e.

f.

Categories of Shapes

1. Join each figure to its name.
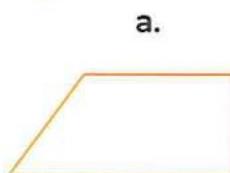
a.   b.   c.   d.   e.

Rectangle	Trapezium	Triangle	Rhombus	Square	Parallelogram
1	2	3	4	5	6

2. Complete.

a. The polygon which has four sides is called _____

b. The polygon which has only two parallel sides is called _____

c. Each two opposite sides are parallel in _____ , _____ , _____ and _____

d. The four sides are equal in length in _____ and _____

e. The four angles are right in _____ and _____

f. In the square, all angles are _____ angles.

g. The parallelogram with 4-right angles is called _____

h. The parallelogram with 4-side are equal in length is called _____

i. The rectangle with 4-sides are equal in length is called _____

j. The rhombus with 4-right angles is called _____

3. Put (✓) to the correct statement and (✗) to the incorrect statement.

a. The sides of the square are equal in length.   [   ]

b. The angles of the rectangle are right.   [   ]

c. The opposite sides in the parallelogram are parallel. [   ]

d. The rhombus has only one pair of parallel sides. [   ]

e. The measure of any angle of the square = 45° [   ]

f. The kite is a parallelogram with two pairs of adjacent sides are equal in length. [   ]

4. Write the name, than describe the attributes of the following shapes.

a. 📖 _____

b. 📖 _____

c. 📖 _____

d. _____

e. _____

5. 📖 Classify the following shapes using a Venn diagram to place the polygons into the Venn diagram. Some shapes may be placed outside the circles.

Shapes with
Acute Angles

Shapes with
Obtuse Angles
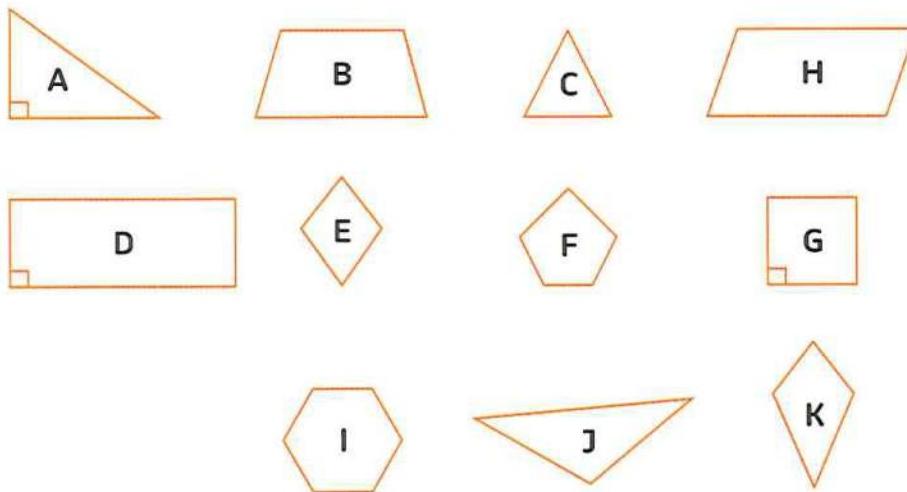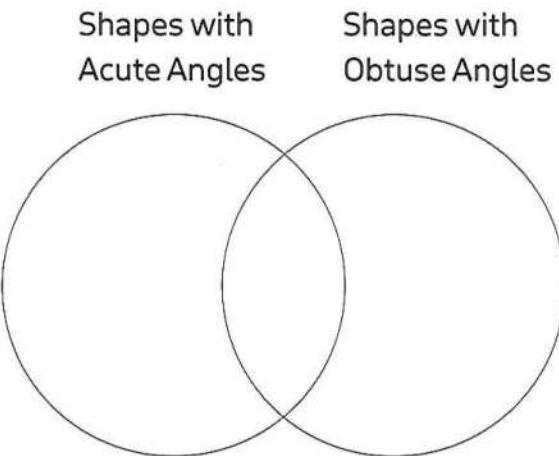
More Categorizing Shapes. Answer the questions.

a. What subcategory could shapes A and D share ?

A. Quadrilaterals   **B.** Parallel sides

C. Right angles   **D.** Obtuse angles

b. Which of the subcategories could include shapes D and G ?

A. Four right angles   **B.** Quadrilaterals

C. Parallel sides   **D.** Perpendicular sides

E. All of the above

6. 📖 **Use the list of quadrilaterals to fill in the chart.**
Remember that the hierarchy goes from most general to more specific.

Rectangle   Parallelogram   Rhombus   Square   Trapezium   Kite

Quadrilateral
[4-sided polygons]

Types of sides

1. _____
Exactly 1-pair of parallel sides

2. _____
2 pairs of parallel sides opposite each other

3. _____
2 pairs of adjacent sides that are congruent

Types of angles

4. _____
4 right angles

5. _____
2 acute angles and 2 obtuse with four congruent sides

6. _____
4 right angles
4 congruent sides

141
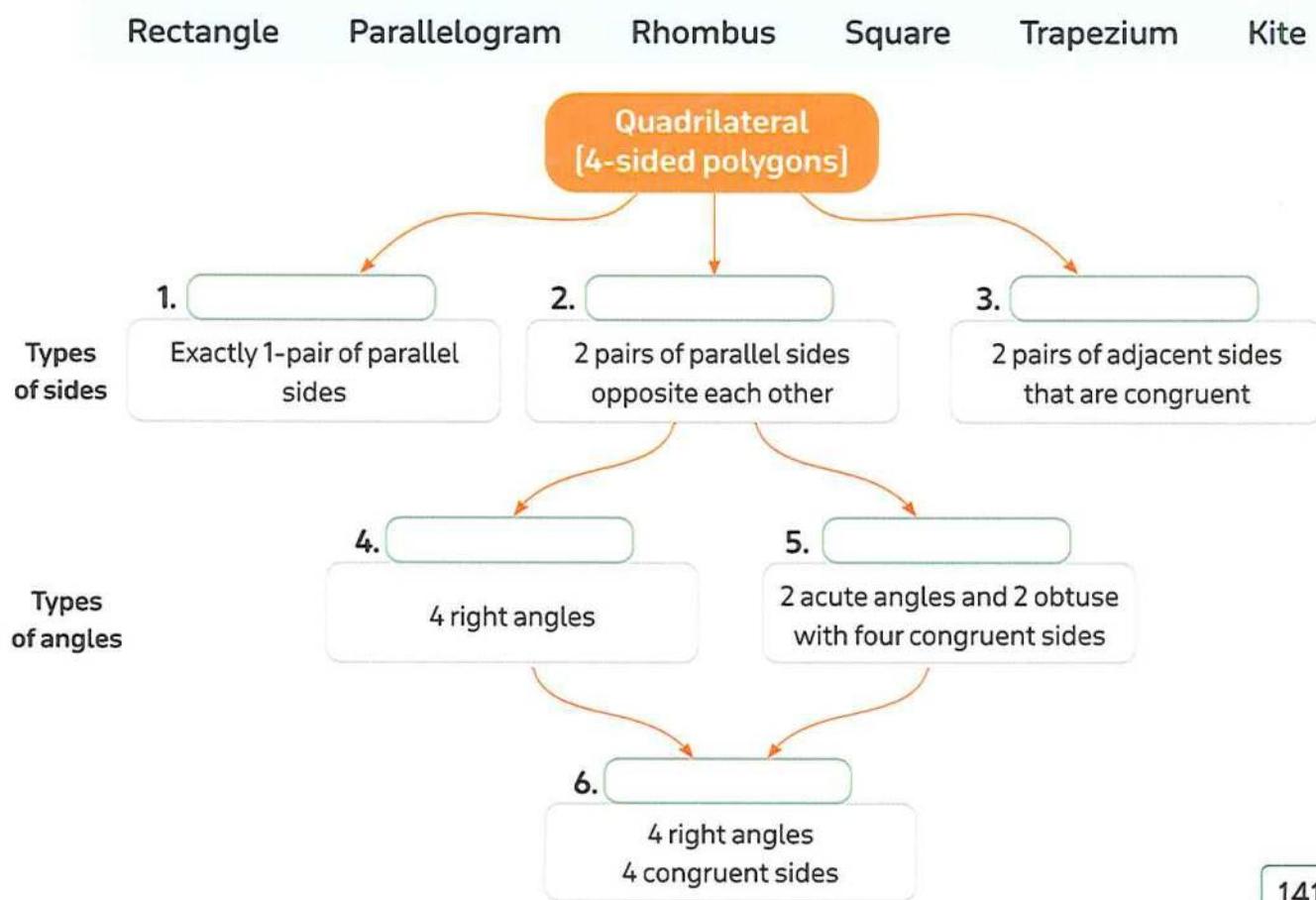
7. Mostafa is making a design using a quadrilateral that has four equal sides and four same-sized angles. **What shape is he using ?**

_____

8. Paula is making a design using a quadrilateral that has two pairs of parallel sides with all sides the same length but with no right angles. **What shape is he using ?**

_____

9. You are making a design using a quadrilateral with only one pair of parallel sides. **What shape could you use ?**

_____

💡 Challenge

10. **Match the quadrilaterals with each description below.**
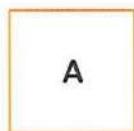
a. Which of the figures are rectangles ? _____

b. Which of the figures have four right angles ? _____

c. Which of the figures have four sides all the same length ? _____

d. Which shapes are parallelograms ? Explain how you made your decision.

_____

Multiple Choice Questions

Choose the correct answer.

1. The polygon which has 3-sides is called _____

 A. square B. quadrilateral C. triangle D. hexagon

2. The parallelogram with four right angles is called _____

 A. trapezoid B. kite C. rhombus D. square

3. The quadrilateral which has 2 pairs of parallel sides opposite each other is _____

 A. parallelogram B. kite C. trapezoid D. triangle

4. The quadrilateral which all sides are the same length and all angles are right angles is _____

 A. rectangle B. square C. parallelogram D. rhombus

5. You are making a design using a quadrilateral with 2 pairs of parallel sides but no right angles. What shape could you use ?

 A. Rectangle B. Rhombus C. Trapezoid D. Kite

6. The four sides are equal in length in square and _____

 A. Rectangle B. Rhombus C. Parallelogram D. Trapezoid

7. The four angles are equal in measure in square and _____

 A. rectangle B. rhombus C. parallelogram D. trapezoid

8. Which of the following is a parallelogram ?

 A. Trapezoid B. Rectangle C. Triangle D. Kite

9. The rectangle which has two adjacent sides are equal in length is called _____

 A. Rhombus B. Kite C. Parallelogram D. Square

10. The rhombus which has right angles is called _____

 A. rectangle B. trapeziod C. square D. pentagon

Tricky Triangles

Learn

Triangles are three-sided polygons. Each side is a line segment. They are named by their vertices. Triangle ABC is formed with line segments $\overline{AB}$, $\overline{BC}$, and $\overline{CA}$.
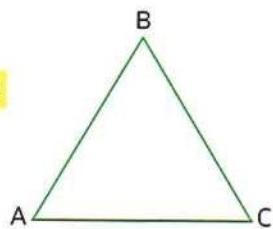
You can classify triangles by the lengths of their sides.

Types of triangles according to the lengths of their sides

1. Equilateral triangle

4 cm 4 cm
4 cm
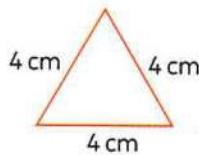
• Its three sides are equal in length.

2. Isosceles triangle

6 cm 6 cm
4 cm
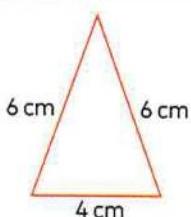
• Two of its sides are equal in length.

3. Scalene triangle

7 cm
3 cm
5 cm
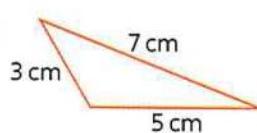
• Its three sides are different in length.

You can also classify by the measures of their angles.

Types of triangles according to the measures of their sides

1. Right-angled triangle

90°
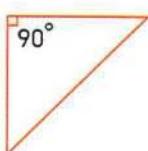
• One of its angles is right angle (Its measure equals 90°).
• Each of the two other angles is an acute angle.

2. Acute-angled triangle

60 50°
70°
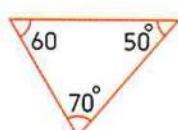
• Each of its three angles is acute angle. (Its measure is less than 90°).

3. Obtuse-angled triangle

30°
120° 30°
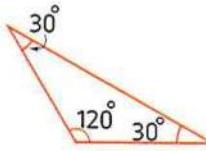
• One of its angles is obtuse angle (Its measure is greater than 90°).
• Each of the two other angles is acute angle.

How to identify the type of a given triangle according to the measures of its angles?

If the greatest angle in measure of this triangle is

1. A right angle	2. An acute angle	3. An obtuse angle
• Then the triangle is a right-angled triangle.	• Then the triangle is an acute-angled triangle.	• Then the triangle is an obtuse-angled triangle.
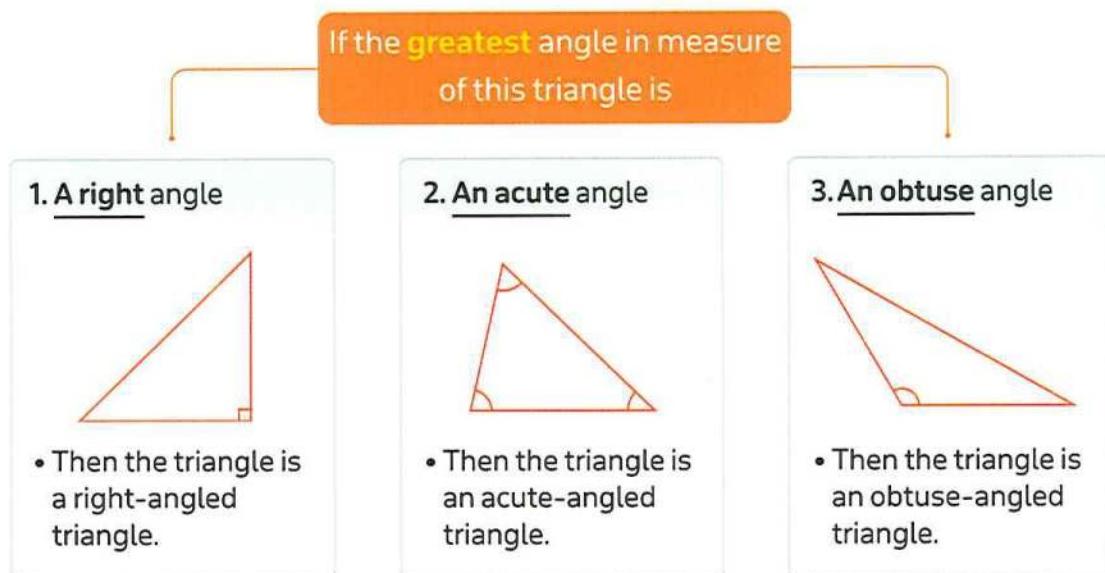
Example 1

Label the angles of each triangle. In each angle, place an A for acute, O for obtuse and R for right and write the type of each triangle according to the measures of its angles.

a.   b.   c.   d.

Solution

a.

An acute-angled triangle

b.

An obtuse-angled triangle

c.

An acute-angled triangle

d.
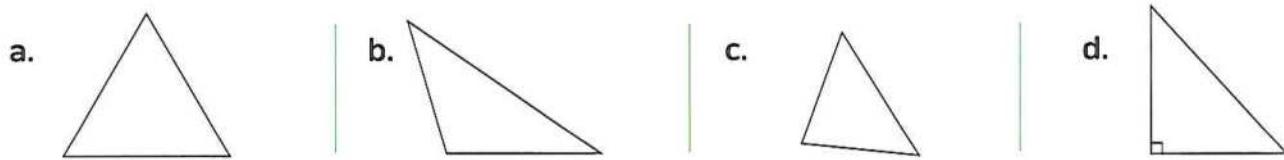
A right-angled triangle
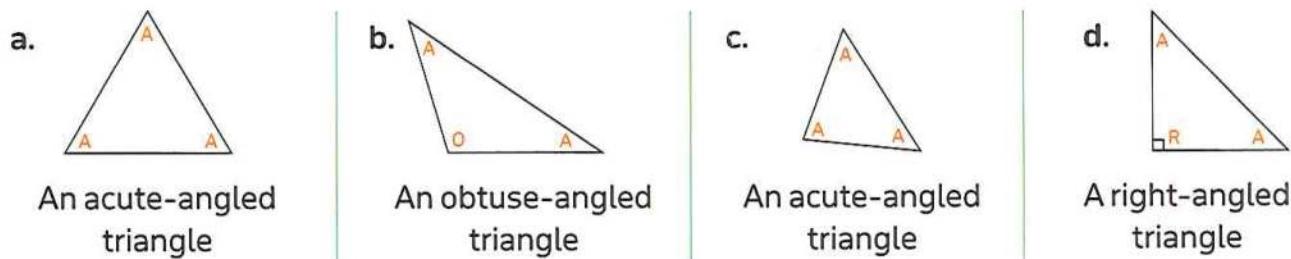
Remarks

1. It is impossible to draw a triangle with two obtuse angles or two right angles because the sides will never close to form a triangle.
2. Any triangle has at least two acute angles.

Example 2

Measure and label each triangle. Then classify each triangle according to its sides and its angles.

a.

b.

c.

Solution 💡

a.

A

6 cm

3 cm

O

4 cm

A
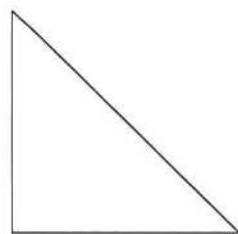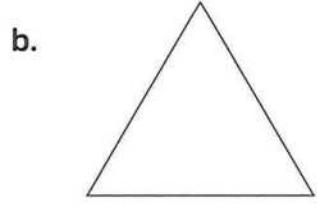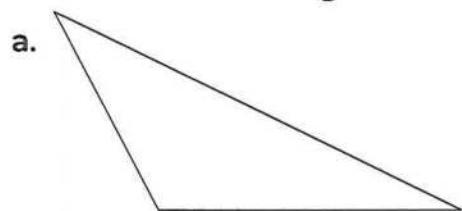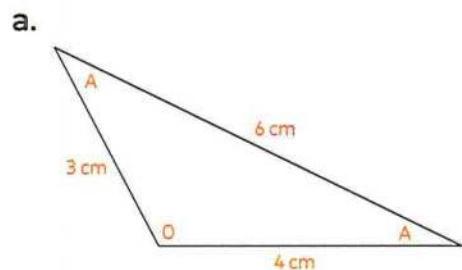
Scalence triangle,
obtuse-angled triangle

b.

A

3 cm   3 cm

A

3 cm

A
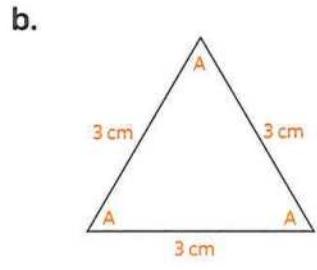
Equilateral triangle,
acute-angled triangle

c.

A

approximately.
4.2 cm

3 cm

R

3 cm

A
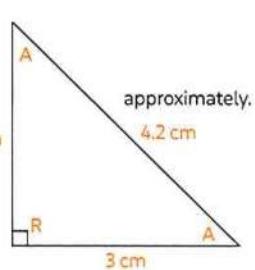
Isosceles triangle,
right-angled triangle

✅ Check your understanding

1. Classify each triangle as equilateral, isosceles, or scalene.

   a. _____

   b. _____

   c. _____
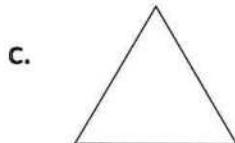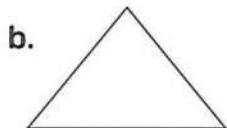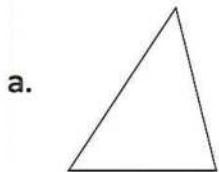
2. Classify each triangle as acute, right, or obtuse.

   a. _____

   b. _____

   c. _____
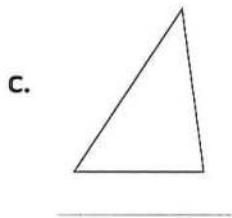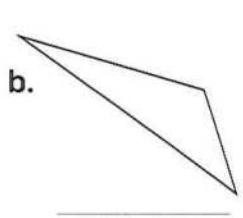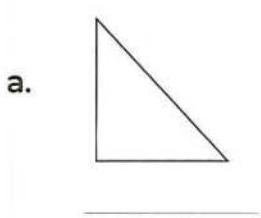
You can add triangle information to the Polygon Anchor Chart.
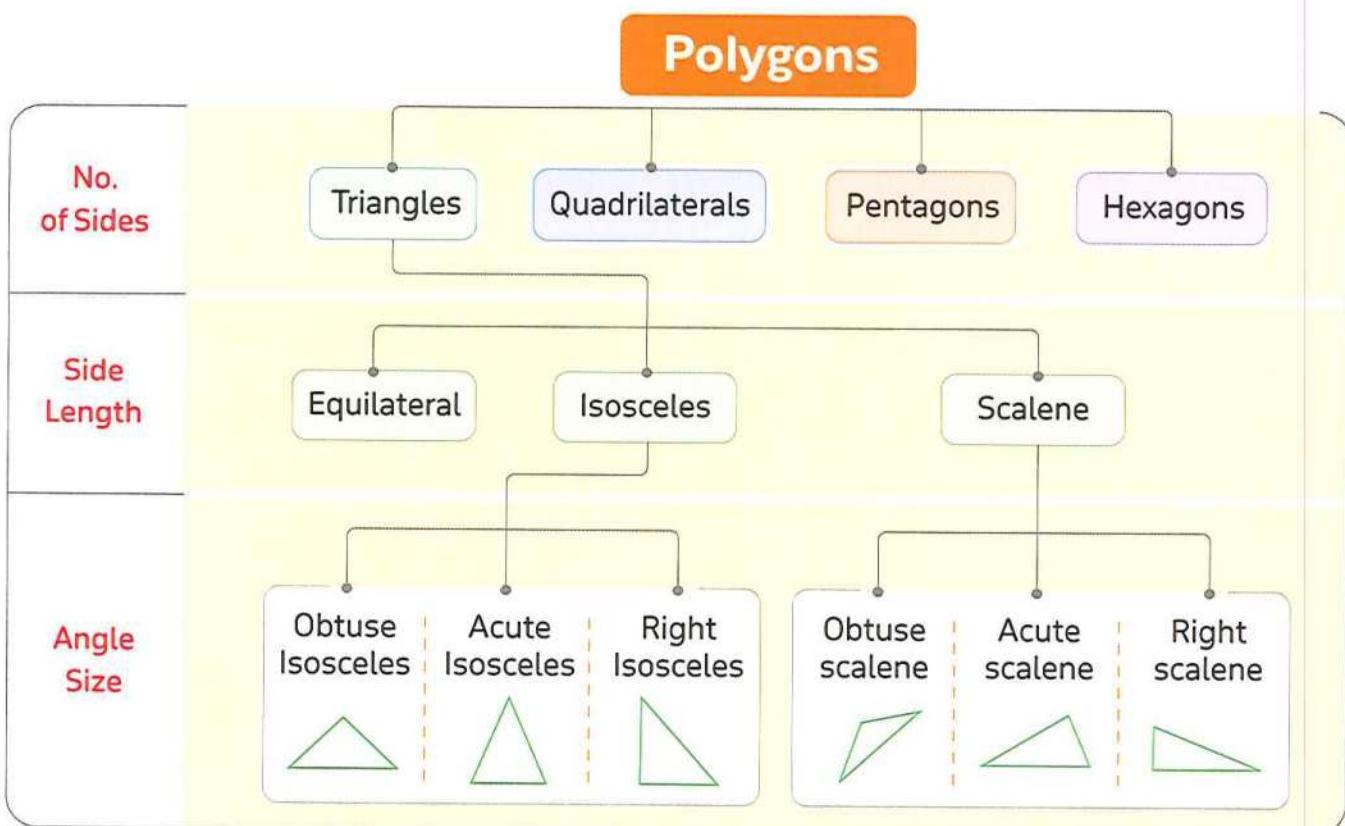
Polygons

No. of Sides	Triangles	Quadrilaterals	Pentagons	Hexagons
Side Length	Equilateral	Isosceles		Scalene
Angle Size	Obtuse Isosceles / Acute Isosceles / Right Isosceles		Obtuse scalene / Acute scalene / Right scalene	

Tricky Triangles

1. Determine the type of each of the following triangles given the measures of their angles.

a. m($\angle$E) = 30° , m($\angle$F) = 90° and m($\angle$G) = 60°   " ——————— -angled triangle"

b. m($\angle$I) = 30° , m($\angle$J) = 40° and m($\angle$K) = 110°   " ——————— -angled triangle"

c. m($\angle$S) = 51° , m($\angle$T) = 67° and m($\angle$U) = 62°   " ——————— -angled triangle"

d. m($\angle$L) = 32° , m($\angle$N) = 58° and m($\angle$M) = 90°   " ——————— -angled triangle"

e. m($\angle$X) = 46° , m($\angle$Y) = 38° and m($\angle$Z) = 96°   " ——————— -angled triangle"

f. m($\angle$H) = m($\angle$B) = 70° and m($\angle$A) = 40°   " ——————— -angled triangle"

g. m($\angle$A) = m($\angle$B) = 45° and $\angle$C is a right angle.   " ——————— -angled triangle"

2. Determine the type of the triangles according to their side lengths using the following data.

a. AB = 6.5 cm , BC = 7 cm and CA = 6.5 cm   " ——————— triangle"

b. XY = 4.5 cm , YZ = 8 cm and ZX = 5.5 cm   " ——————— triangle"

c. NO = 4.5 cm , OR = 4.5 cm and RN = 4.5 cm   " ——————— triangle"

d. MA = AY = 9 cm and YM = 10 cm   " ——————— triangle"

e. AM = 10 cm , MR = 7 cm and RA = $\frac{1}{2}$ AM   " ——————— triangle"

3. Complete.

a. The triangle is a polygon that has ——— sides and ——— angles.

b. The equilateral triangle is a triangle whose sides are ———

c. Any triangle has at least ——— acute angles.

d. The triangle ABC is an equilateral triangle where AB = 5 cm , then
AC = ——— cm and BC = ——— cm

4. Put (✓) to the correct statement and (✗) to the incorrect statement.

    a. There can be two right angles in one triangle.   [   ]

    b. There can be three acute angles in one triangle.   [   ]

    c. All the angles of the obtuse-angled triangle are obtuse.   [   ]

    d. There can be a right angle and an obtuse angle in one triangle.   [   ]

    e. It is possible to draw a triangle with two obtuse angles.   [   ]

    f. There can be an equilateral triangle that is also a scalene triangle.   [   ]

    g. There can be an obtuse triangle that is also isosceles triangle.   [   ]

    h. There can be a right triangle that is also scalene triangle.   [   ]

5. 📖 **Identify Triangle Types Using Measurement. Measure and label each triangle.**
Then, select the best name for each triangle based on its properties.
Some triangles may be classified in more than one way.

a.   What two types of triangles are shown ?

    A. scalene triangle   **D.** right triangle

    B. isosceles triangle   **E.** acute triangle

    C. equilateral triangle   **F.** obtuse triangle
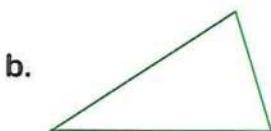
b.   Which two types of triangles are shown ?

    A. scalene triangle   **D.** right triangle

    B. isosceles triangle   **E.** acute triangle

    C. equilateral triangle   **F.** obtuse triangle
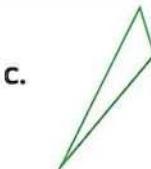
c.   Which two types of triangles are shown ?

    A. scalene triangle   **D.** right triangle

    B. isosceles triangle   **E.** acute triangle

    C. equilateral triangle   **F.** obtuse triangle

6. Classify each triangle by its sides and angles.

a.

_____

b.

_____

c.

_____

d.

_____

e.

_____

f.

_____
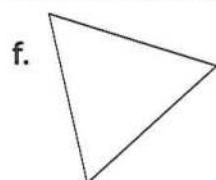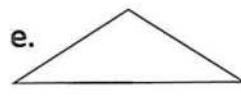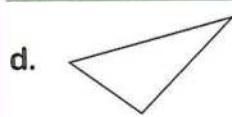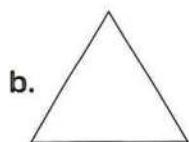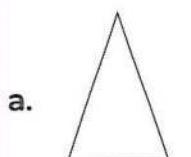
🔧 Challenge

7. Draw the next figure in each pattern. Then classify the new triangle in the pattern by the length of its sides and the measure of its angles.

Key : E = equilateral , I = isosceles , S = scalene

R = right , A = acute , O = obtuse
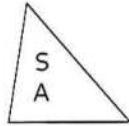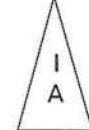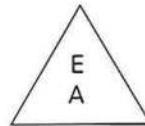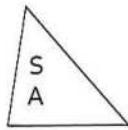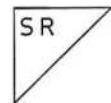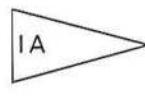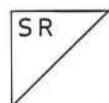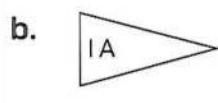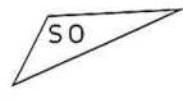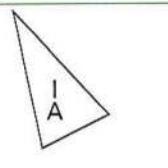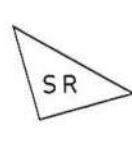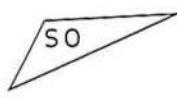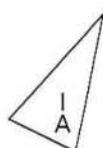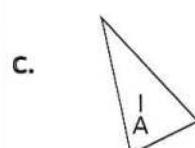
a.

E A | I A | S A | E A | I A | S A

Look for continuation of pattern.

b.

I A | S R | E A | I A | S R

Look for continuation of pattern.

c.

I A | I A | S O | S R | I A | I A | S O

Look for continuation of pattern.

Choose the correct answer.

1. If the side lengths of a triangle are different, then the triangle is called _____ triangle.
   A. equilateral   B. isosceles   C. scalene

2. The triangle whose side lengths are 7 cm, 4 cm and 7 cm is called _____ triangle.
   A. equilateral   B. isosceles   C. scalene

3. The triangle whose side lengths are 8 cm, 6 cm and _____ cm is called scalene triangle.
   A. 8   B. 6   C. 7

4. $50°$, $70°$ and $60°$ are the measures of the angles of _____ triangle.
   A. an obtuse-angled   B. a right-angled   C. an acute-angled

5. The triangle whose side lengths are _____ is an equilateral triangle.
   A. 7 cm, 6 cm, 7 cm   B. 5 cm, 5 cm, 5 cm
   C. 5 cm, 6 cm, 7 cm   D. 3 cm, 4 cm, 4 cm

6. The triangle whose measures of angles are $40°$, $50°$ and _____ is right-angled triangle.
   A. $50°$ B. $40°$ C. $90°$ D. $180°$

7. The triangle whose measures of angles are _____ is an obtuse-angled triangle.
   A. $30°$, $100°$, $50°$ B. $30°$, $60°$, $90°$ C. $70°$, $80°$, $30°$ D. $50°$, $80°$, $50°$

8. The opposite triangle is _____
   A. acute   B. right
   C. obtuse   D. equilateral

9. The opposite triangle is _____
   A. equilateral   B. isosceles
   C. scalene   D. obtuse

10. I am a triangle with only 2 equal sides, the measure of one of my angles is greater than $90°$.
    What kind of triangle am I ?
    A. isosceles, right   B. isosceles, obtuse   C. scalene, obtuse   D. isosceles, acute
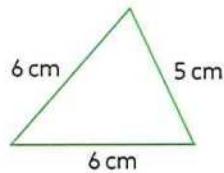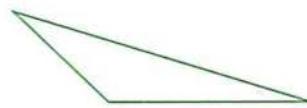
- **Using Tiling to Calculate Area**
- **Calculating Area with Fractional Dimensions**
- **Applying the Area Formula**

Learn ① Using tiling to calculate area

How to find the area of rectangle by counting the number of equal units which the figure consists.

Example 1

Count the unit tiles to determine the area of the opposite rectangle.

Solution

Number of unit tiles = area of rectangle
= 24 tiles (square units)
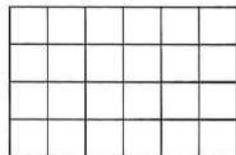
We can find area of rectangle by using
the rule = L × W
= 6 × 4 = 24 tiles (square units)

Example 2

Draw a rectangle with an area 12 square units.

Solution

To draw a rectangle of area 12 square units, we find factors of 12 as :

1 × 12 = 12

2 × 6 = 12

3 × 4 = 12
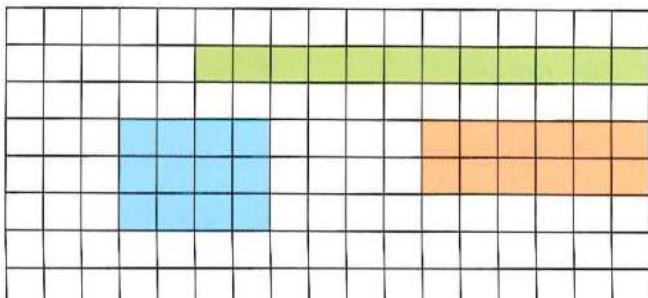
We can draw a rectangle of dimensions are

1 unit and 12 units or 2 units and 6 units or 3 units and 4 units

Learn ② Tiling with fractional dimensions

How to draw and find area of a rectangle with fractional dimensions.

Example **3**

Draw a rectangle with dimensions 5 units and $2\frac{1}{2}$ units, then calculate its area.
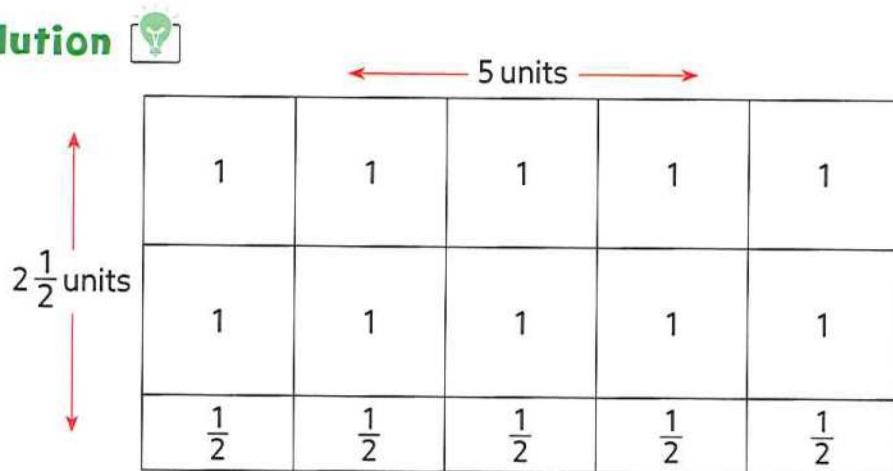
Solution

Note that
Area of rectangle = number of squares which formed the rectangle

Area = $(5 \times 2) + (5 \times \frac{1}{2}) = 10 + 2\frac{1}{2} = 12\frac{1}{2}$ square units.

Example **4**

Draw a rectangle with dimensions $4\frac{1}{2}$ units and $3\frac{1}{2}$ units, then calculate its area.
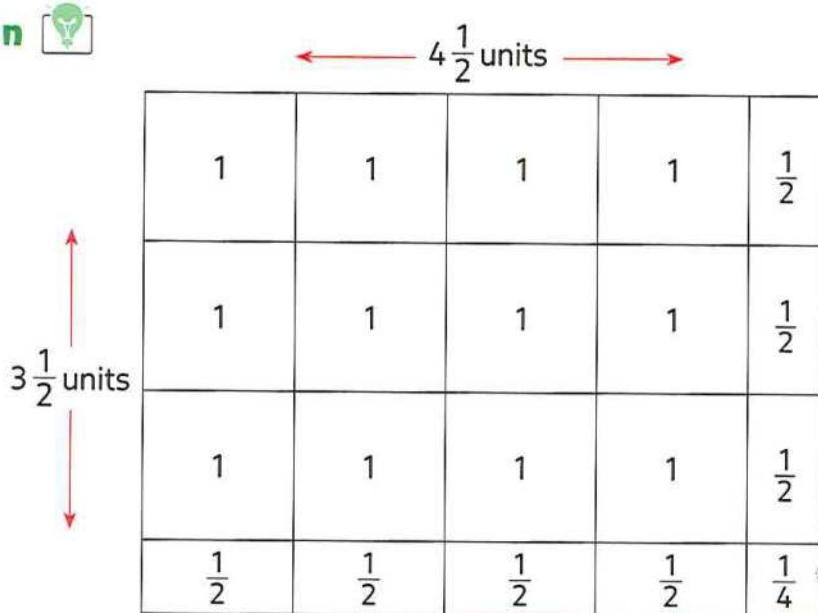
Solution

$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

Area = $(4 \times 3) + (7 \times \frac{1}{2}) + (1 \times \frac{1}{4}) = 12 + 3\frac{1}{2} + \frac{1}{4} = 15\frac{3}{4}$ square units

Example 5

Draw a model for a rectangle measuring $5\frac{1}{3}$ meters by $3\frac{1}{2}$ meters, then find its area.

Solution

$$\longleftarrow\quad 5\frac{1}{3}\text{ units}\quad\longrightarrow$$

$3\frac{1}{2}$ units

1	1	1	1	1	$\frac{1}{3}$
1	1	1	1	1	$\frac{1}{3}$
1	1	1	1	1	$\frac{1}{3}$
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{6}$
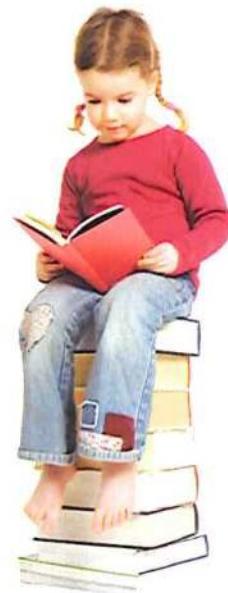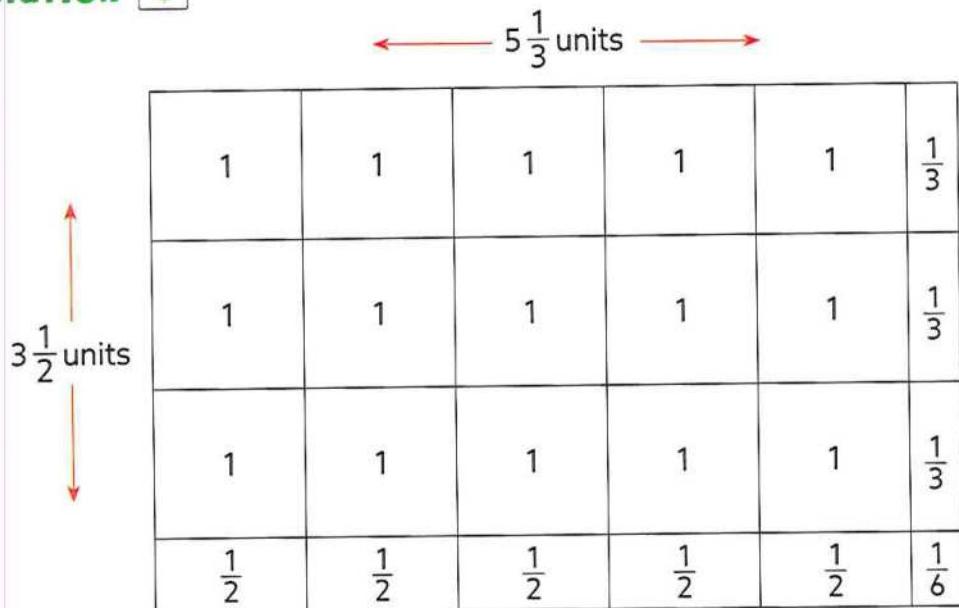
$$\text{Area} = (5 \times 3) + \left(5 \times \frac{1}{2}\right) + \left(3 \times \frac{1}{3}\right) + \left(1 \times \frac{1}{6}\right) = 15 + 2\frac{1}{2} + 1 + \frac{1}{6} = 18\frac{2}{3} \text{ square meters.}$$

✓ Check your understanding

Draw a model for a rectangle measuring $2\frac{3}{4}$ meters by $3\frac{1}{2}$ meters, then find its area.

Learn ③ Modeling area with fractions

How to model rectangles with fractional dimensions.

Example 6

Draw a model for a rectangle of dimensions are $\frac{1}{5}$ units and $\frac{2}{3}$ units and find its area.

Solution 💡

- Draw a rectangular model of $\frac{1}{5}$ vertically as fig. [1]

- Draw a rectangular model of $\frac{2}{3}$ horizontally as fig. [2]

- Imagine the two models if one of them above the other.

- Redraw the models using one rectangle.

- Divide the rectangle vertically into fifths and horizontally into thirds as fig. [3]

- The area of required rectangle is shown where shaded overlaps.

- We have [2 out of 15] overlapping shaded, then area of rectangle $= \frac{2}{15}$ square units.
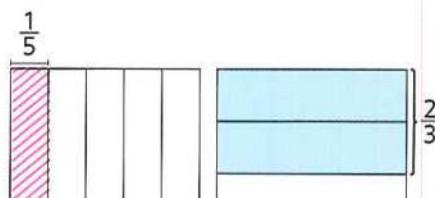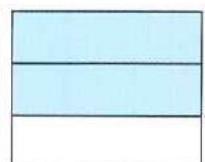
fig.[1]   fig.[2]
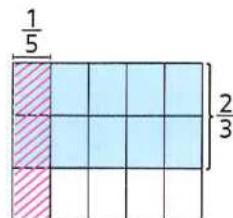
fig.[3]

✓ Check your understanding

Draw a model for a rectangle of dimensions are $\frac{3}{4}$ units and $\frac{2}{5}$ units, then find its area.

Learn ④ Applying the area formula

You can find area of rectangle by using formula : $A = L \times W$

Example 7

Find the area of the following rectangles.

a. $3\frac{1}{2}$ units by $2\frac{2}{5}$ units

b. $\frac{3}{4}$ m by $\frac{1}{3}$ m

c. 3 km by $2\frac{1}{3}$ km
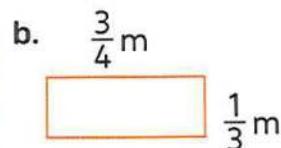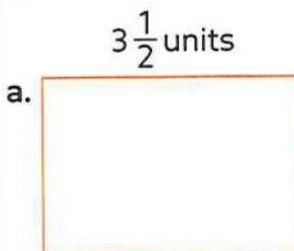
Solution

a. Area $= L \times W = 3\frac{1}{2} \times 2\frac{2}{5} = \frac{7}{2} \times \frac{12}{5} = \frac{42}{5} = 8\frac{2}{5}$ square units

b. Area $= L \times W = \frac{3}{4} \times \frac{1}{3} = \frac{1}{4}$ m^2

"There are another way mathematicians write square units is by putting an exponent 2 above the unit as m^2 or cm^2 and so on."

c. Area $= L \times W = 3 \times 2\frac{1}{3} = 3 \times \frac{7}{3} = 7$ km^2

Note that You can use any strategy to find the result of product.

Example 8

Ahmed has a garden of length 8 meters and width $\frac{2}{3}$ meter. What is the area of Ahmed's garden ?

Solution

$A = L \times W = 8 \times \frac{2}{3} = \frac{16}{3} = 5\frac{1}{3}$ m^2

✓ Check your understanding

Find area of the following rectangles.
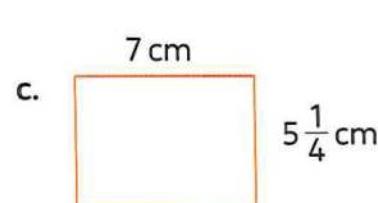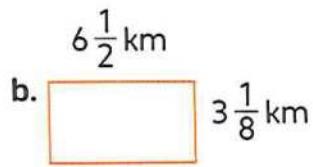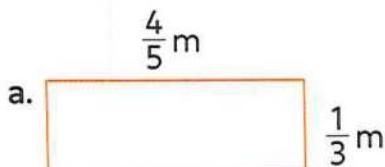
a. $\frac{4}{5}$ m by $\frac{1}{3}$ m   Area = _____

b. $6\frac{1}{2}$ km by $3\frac{1}{8}$ km   Area = _____

c. 7 cm by $5\frac{1}{4}$ cm   Area = _____

- **Using Tiling to Calculate Area**
- **Calculating Area with Fractional Dimensions**
- **Applying the Area Formula**

● REMEMBER   ● UNDERSTAND   ○ APPLY   ∴ PROBLEM SOLVING   📖 From the school book

1. Count the unit tiles to determine the area of each rectangle.

a. 📖
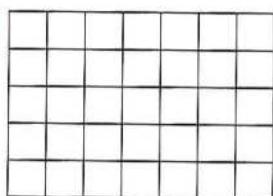
b.
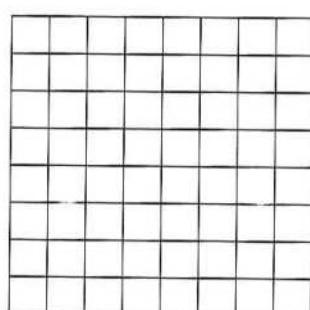
c.
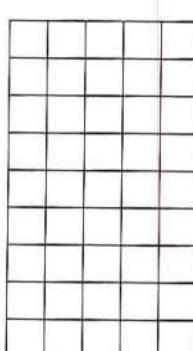
2. Draw a rectangle with a length of 8 units and width 5 units, then find its area.
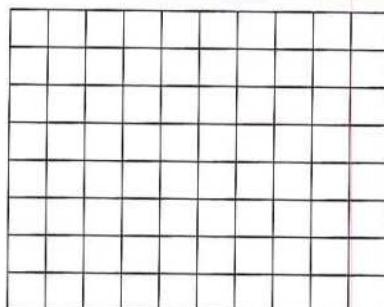
3. 📖 Draw a rectangle with a length of 15 units and a width of 12 units, then find its area.
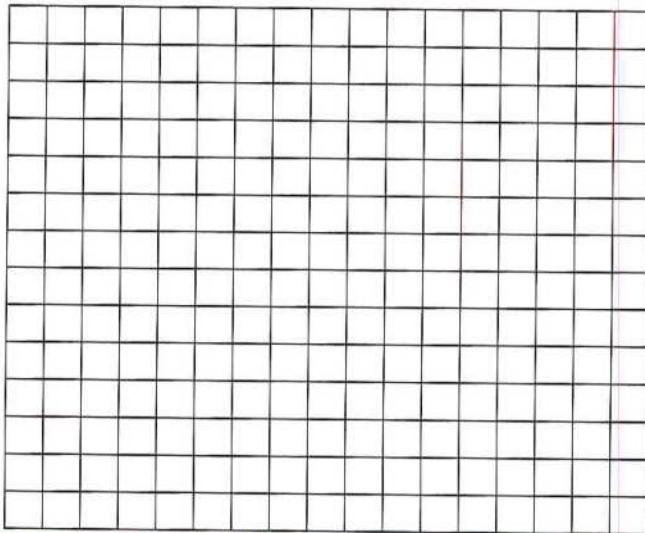
4. Draw a rectangle with an area of 12 square units.
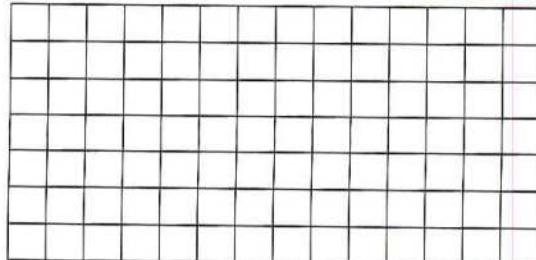
5. 📖 Draw a rectangle with an area of 24 square units.
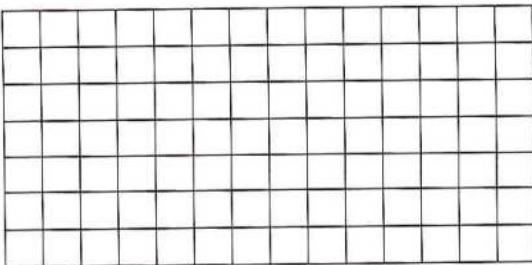
6. Draw a rectangle with an area of 30 square units.
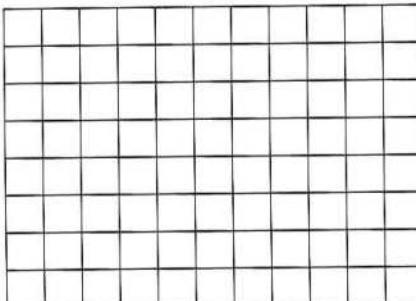
7. 📖 Find the area of the rectangle below by tiling (sketching in the unit square).

8. Answer the following.

a. 📖 Draw a rectangle with dimensions $4\frac{1}{2}$ units × $2\frac{1}{2}$ units, then, calculate and record its area. Be sure to label your answer.
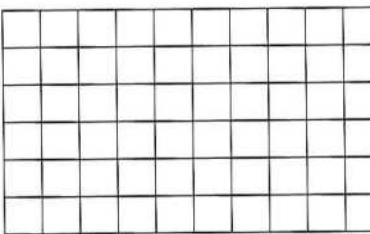
b. 📖 Draw a rectangle with dimensions of $6\frac{1}{2}$ units × $4\frac{1}{2}$ units. Then, calculate and record its area. Be sure to label your answer.
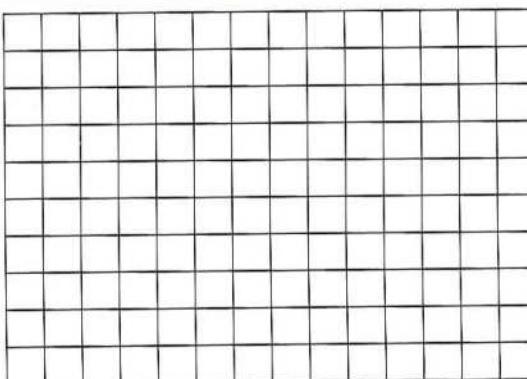
c. 📖 Doha is tilling her $4 × 6\frac{1}{2}$-unit bathroom. The tiles come in 1-unit squares. How many tiles will she need to cover the floor? Model your thinking.
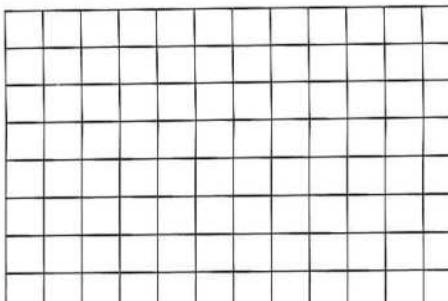
d. 📖 Amir measures a painting. It is $4\frac{1}{3}$ units long by $2\frac{1}{2}$ units wide. Draw a model of the painting. Be prepared to complete the problem with your class.
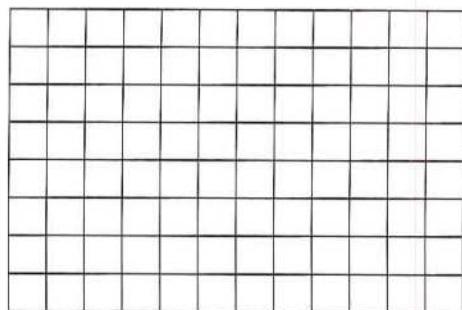
e. 📖 Draw a model for a rectangle measuring $9\frac{1}{4}$ meters by $3\frac{1}{2}$ m. Then, find the area.
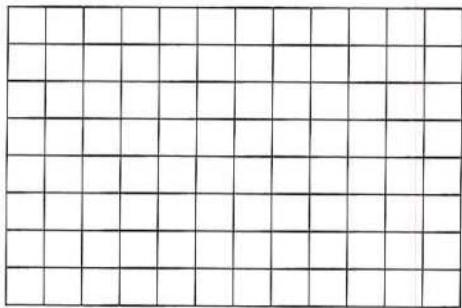
f. 📖 Draw a model for a rectangle measuring $2\frac{1}{2}$ meters by $10\frac{3}{4}$ m. Then, find the area.
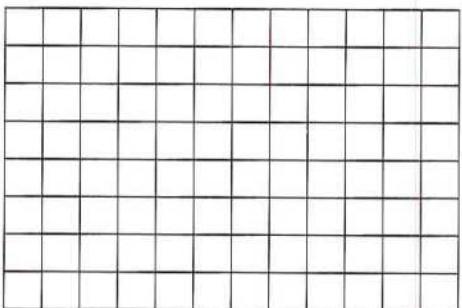
g. 📖 Draw a model for a rectangle measuring $9\frac{1}{2}$ units by $2\frac{1}{3}$ units. Then, find the area.
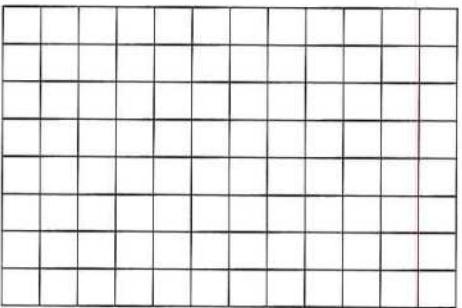
9. Draw and find the area of a model measuring by the following dimensions.

a. $\frac{1}{3}$ unit × $\frac{1}{4}$ unit

b. 📖 $\frac{2}{3}$ unit × $\frac{1}{2}$ unit

c. 📖 $\frac{4}{5}$ centimeters × $\frac{3}{8}$ cm

d. $\frac{5}{6}$ m × $\frac{1}{3}$ m

e. 📖 $\frac{2}{9}$ meters × $\frac{1}{5}$ m

f. 📖 $\frac{3}{4}$ kilometers × $\frac{2}{3}$ km

g. $\frac{3}{5}$ m × $\frac{3}{4}$ m

h. $\frac{2}{7}$ unit × $\frac{7}{9}$ unit

10. **Multiplying to find area.**

a. 📖 Akram's herb garden is 10 units long by $\frac{1}{3}$ unit wide.
What is the area of Akram's herb garden ?

10 units $\frac{1}{3}$ unit
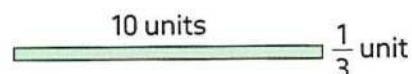
b. 📖 A trench was dug in Doaa's backyard to fix her plumbing. The ditch was 8 meters long and $\frac{1}{10}$ m wide. What is the area of the ditch ?

c. 📖 What is the area of the rectangle shown ?

$\frac{3}{4}$ m

$\frac{4}{5}$ m

d. Mostafa draw the opposite rectangle.
Calculate the area
of Mostafa's rectangle.

$3\frac{1}{2}$ m

$4\frac{1}{3}$ m
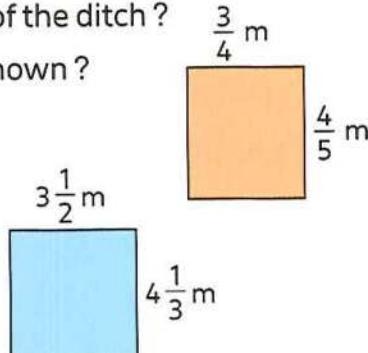
e. 📖 Omar owns a parking lot. The lot is 3 kilometers long and $2\frac{1}{2}$ km wide.
What is the area of the parking lot ?

f. 📖 A mosque has a window that is $\frac{3}{10}$ meter wide and 2 m long. What is the area of the window in square meters ?

g. 📖 The university is building a new courtyard.
The outline of the courtyard is shown.
Find its area.

$\frac{1}{4}$ km

$\frac{2}{11}$ km
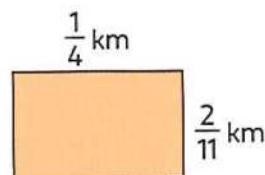
h. Which is greater in area ?
A rectangle of length $3\frac{1}{2}$ m and width $5\frac{1}{3}$ m

or a rectangle of length $4\frac{2}{3}$ m and width $4\frac{1}{2}$ m

i. What is the sum of areas of the following two rectangles ?

$9\frac{1}{3}$ cm

$6\frac{3}{4}$ cm

$8\frac{3}{4}$ cm

$1\frac{5}{7}$ cm
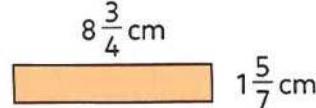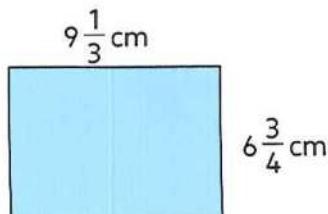
Choose the correct answer.

1. The area of the opposite

rectangle = —————— square units.

   A. 15   B. 18   C. 20   D. 24
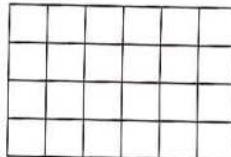
2. The area of rectangle of length $\frac{2}{3}$ cm and width $\frac{1}{4}$ cm is —————— cm^2

   A. $\frac{11}{12}$ B. $\frac{1}{6}$ C. $\frac{5}{12}$ D. $\frac{3}{8}$

3. The area of rectangle of dimensions $7\frac{1}{2}$ meters and $2\frac{1}{5}$ meters is —————— m^2

   A. $5\frac{3}{10}$ B. $14\frac{3}{10}$ C. $9\frac{7}{10}$ D. $16\frac{1}{2}$

4. The area of rectangle of dimensions $\frac{2}{5}$ m and $\frac{1}{3}$ m   ◯   The area of rectangle of length $\frac{3}{8}$ m and width $\frac{1}{5}$ m

   A. >   B. <   C. =

5. The area of room of length 6 m and width $3\frac{1}{2}$ m is —————— m^2

   A. 19   B. $9\frac{1}{2}$

   C. 21   D. 42

6. Area of rectangle = ——————

   A. $L + W$ B. $L \times W$

   C. $\frac{L}{W}$ D. $[L + W] \times 2$

7. The area of rectangle of dimensions $3\frac{1}{5}$ cm and $2\frac{1}{2}$ cm is ——————

   A. $8 m^2$ B. $8 cm^2$

   C. $8 km^2$ D. 8 cm

8. Area of opposite rectangle

= —————— cm^2
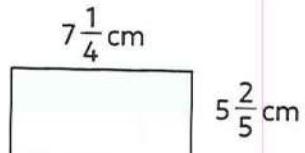
   A. $25\frac{3}{10}$ B. $40\frac{1}{2}$

   C. $12\frac{13}{20}$ D. $39\frac{3}{20}$

9. The area of rectangle with length $\frac{3}{4}$ km and width $\frac{1}{3}$ km is ——————

   A. $\frac{1}{4}$ km   B. $\frac{1}{4}$ km^2

   C. $\frac{13}{12}$ km   D. $\frac{1}{2}$ km^2

10. A mosque has a window that is $\frac{3}{5}$ meter wide and $1\frac{1}{2}$ meters long. What is the area of the window in square meters ?

   A. $\frac{9}{10} m^2$ B. $2\frac{1}{2} m^2$ C. $2\frac{1}{10} m^2$ D. $10\frac{1}{2} m^2$

Concept 2
Coordinate Planes

Did You Know?!

Air traffic is managed and regulated by using **coordinate** geometry. Coordinates of the flight are used to describe its current location of the aircraft.

Lesson No.	Lesson Name	Learning Objectives
Lessons 6 to 8	Introduction to Coordinate Planes	• Students will describe a coordinate plane. • Students will define elements of a coordinate plane.
	Plotting Points on a Coordinate Plane	• Students will identify points on a coordinate plane. • Students will name points on a coordinate plane.
	Coordinate Designs	• Students will plot ordered pairs on a coordinate plane to create a picture.
Lesson 9	From Patterns to Points	• Students will identify and extend numerical patterns. • Students will graph points from a numerical pattern.
Lessons 10 & 11	Graphing Real-World Data	• Students will interpret data on coordinate planes. • Students will solve real-world problems involving data on coordinate planes.
	Interpreting Real-World Graphs	• Students will interpret data on coordinate planes. • Students will solve real-world problems involving data on coordinate planes.

- **Introduction to Coordinate Planes**
- **Plotting Points on a Coordinate Plane**
- **Coordinate Designs**

Learn ① The distance between two points on a ray

The distance between the two points A and B on a horizontal ray or a vertical ray = AB where :

The length of $\overline{AB}$ = number of the ending point − number of the starting point = B − A

For Example :
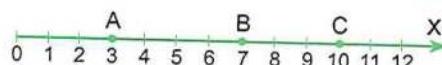
[1] In the following figure :	[2] In the following figure :
A B C X 0 1 2 3 4 5 6 7 8 9 10 11 12 If A represents the number 3 , B represents the number 7 and C represents the number 10 , then AB = B − A = 7 − 3 = 4 units. , BC = C − B = 10 − 7 = 3 units. and AC = C − A = 10 − 3 = 7 units.	If M represents the number 2 , N represents the number 7 and K represents the number 9 , then MN = N − M = 7 − 2 = 5 units. , NK = K − N = 9 − 7 = 2 units. and MK = K − M = 9 − 2 = 7 units.
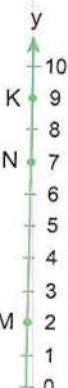
Learn ② Locating points on a coordinate plane

• The coordinate plane

The coordinate plane is the plane determined by a horizontal line , called the x-axis , and a vertical line , called the y-axis , intersecting at a point , called **the origin.** It is labeled as "O"
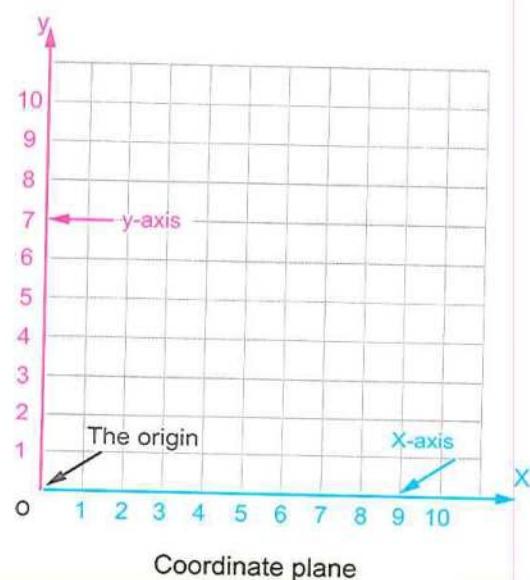
Coordinate plane

• The ordered pair

The ordered pair is a pair of numbers used to locate any point on a coordinate plane. Ordered pairs are written left to right (x , y)
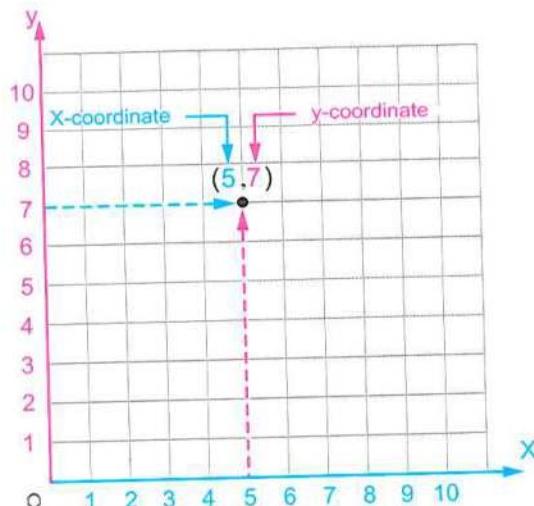
For Example :
The ordered pair (5 , 7)

X-coordinate

The first number in an ordered pair, which tells how far to move left or right from the origin.

It is labeled as "**X**"

Y-coordinate

The second number in an ordered pair, which tells how far to move up or down from the origin.

It is labeled as "**Y**"

Note that

The coordinates for the origin are (0 , 0)

• How can you graph a point on a coordinate plane ?

Example A

Graph the point R (4 , 3)
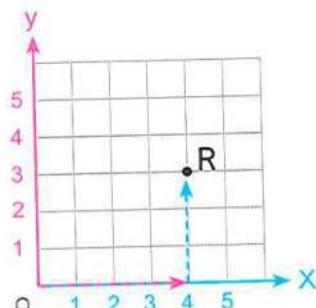
Step 1

Start at the origin.

Step 2

Move right 4 units.

Step 3

Move up 3 units. Draw a point. Label it R.

164

Example B

Graph the point K (3 , 0)
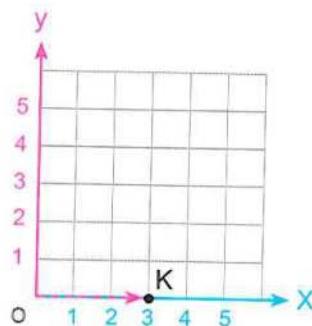
Step 1
Start at the origin.

Step 2
Move right 3 units.

Step 3
Move up or down 0 units. Draw a point. Label it K.

Example 1

Using the following graph, answer [a] , [b] and [c]

a. What is the name of each of the following points ?

1. (3 , 1)

2. (7 , 8)

3. (1 , 4)

4. (5 , 0)

5. (8 , 7)

6. (4 , 2)

7. (5 , 5)

8. (1 , 3)
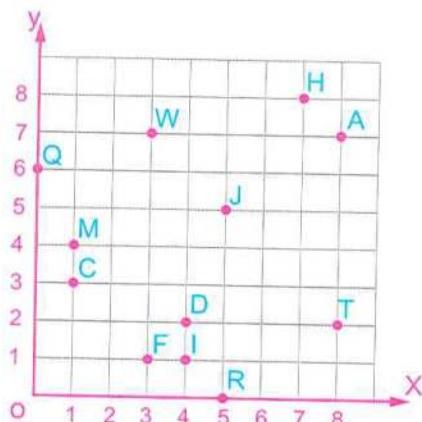
b. Write the ordered pair for each of the following points :

1. A

2. T

3. W

4. I

5. Q

c. Plot the following points on the coordinates grid :

1. B (2 , 8)

2. E (0 , 7)

3. X (6 , 3)

4. S (8 , 5)

5. P (2 , 1)

6. G (7 , 7)

Solution

a. 1. F

2. H

3. M

4. R

5. A

6. D

7. J

8. C

b. 1. (8 , 7)

2. (8 , 2)

3. (3 , 7)

4. (4 , 1)

5. (0 , 6)

c. The points are represented on the coordinates grid.

165
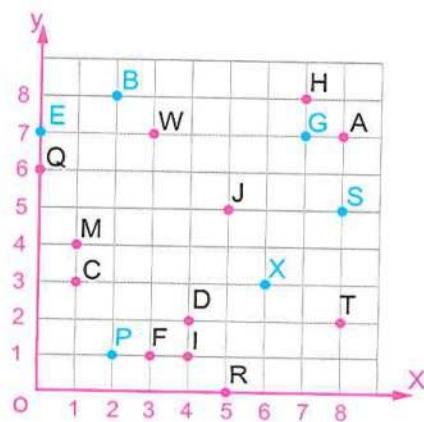
Example 2

Graph the points A $(1,6)$, B $(1,2)$, C $(7,2)$, D $(7,6)$

Connect them in order : A $\longrightarrow$ B $\longrightarrow$ C $\longrightarrow$ D $\longrightarrow$ A

a. What is the name of the figure ABCD ?

b. What attributes did you use to identify it ?

c. What line segments in this figure are parallel ?

d. What line segments are perpendicular ?

e. What is the distance between A and D ?

Solution

a. ABCD is a rectangle.

b. Two sets of parallel sides, four right angles, two sets of two equal sides.

c. $\overline{AD} \parallel \overline{BC}$, $\overline{DC} \parallel \overline{AB}$

Remark

The symbol $\parallel$ as a way to show that two lines are parallel.
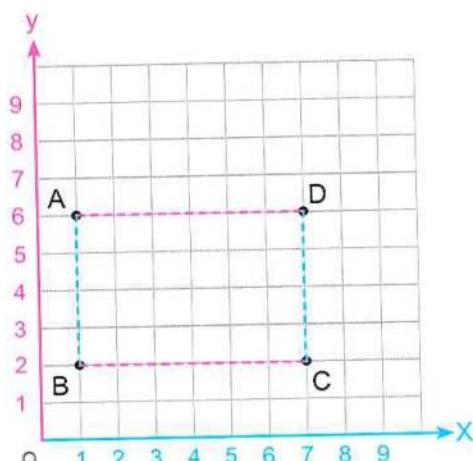
d. $\overline{AB} \perp \overline{BC}$, $\overline{BC} \perp \overline{DC}$, $\overline{DC} \perp \overline{AD}$, $\overline{AB} \perp \overline{AD}$

Remark

The symbol $\perp$ as a way to show that two lines are perpendicular.

e. The distance between A and D is 6 units.

✓ Check your understanding

Plot the points on the coordinate grid.

A $(3,5)$, B $(6,5)$, C $(6,2)$, D $(3,2)$ and connect the points in order.

a. What polygon did you create ?

b. Complete.

- $\overline{AD} \parallel$ _____
- $\overline{DC} \perp$ _____

- $\overline{AB} \parallel$ _____
- $\overline{BC} \perp$ _____

● REMEMBER ● UNDERSTAND ○ APPLY •• PROBLEM SOLVING   📖 From the school book

1. 📖 Use the number line to answer the questions.

0   A   B   C   10
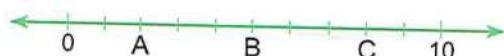
a. What is the value of B ?

b. What is the value of A ?

c. What is the value of C ?

d. Write a D above the point with a value of 7.

2. Use the number line to answer the questions.

0   A   B   C   D   14
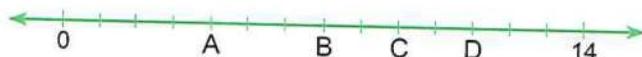
a. What is the value of C ?

b. What is the value of D ?

c. What is the value of A ?

d. How far is point B from D ?

e. How far is point C from A ?

3. 📖 Use the number line to answer the questions.

A   B   C D
0   1 $2\frac{1}{2}$ 4 $5\frac{1}{2}$ 6
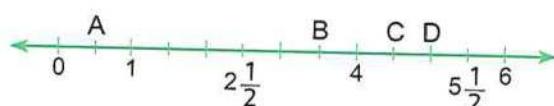
a. What is the value of each space between the hashmarks ?

b. What is the value of A ?

c. What is the value of B ?

d. What is the value of C ?

e. What is the value of D ?

4. 📖 Use the number line to answer the questions.

a. What is the value of A ?

b. What is the value of B ?

c. What is the value of C ?

d. How far is point C from point A ?

e. How far is point B from point A ?

10
9
8 — C
7
6 — B
5
4
3
2 — A
1
0

167
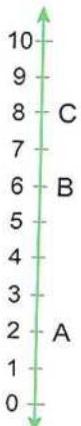
5. What is the value of each space between the hashmarks ?

a.
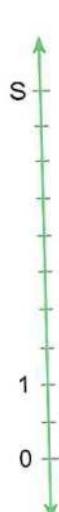
b. 📖

c.
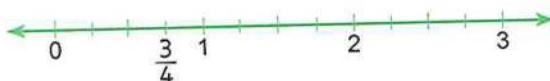
d.
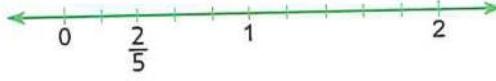
6. In the following grid, observe and answer.

a. What is the name of each of the following points ?

1. $(0,8)$ **2.** $(9,6)$

3. $(6,0)$ **4.** $(2,3)$

5. $(1,0)$ **6.** $(7,9)$

7. $(4,5)$ **8.** $(2,9)$

9. $(9,0)$ **10.** $(0,0)$

b. Write the ordered pair of each of the following points :

1. W ——   **2.** Y ——   **3.** N ——

4. F ——   **5.** C ——   **6.** X ——

7. K ——   **8.** U ——   **9.** I ——

c. Plot the following points on the coordinates grid :

1. E $(7,5)$ **2.** M $(1,5)$ **3.** Z $(8,2)$

4. B $(9,3)$ **5.** V $(8,9)$ **6.** S $(5,8)$

168
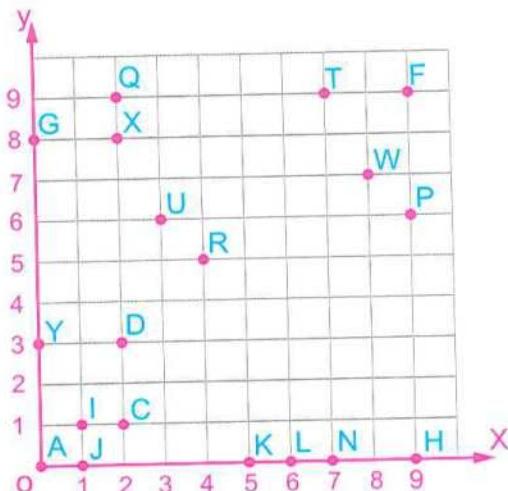
7. In the opposite figure :

    a. Complete :

        1. Point C (———— , ————) and

        point D (———— , ————)

        2. AC = ———— units and

        CD = ———— units.

    b. On the figure, plot the points

      M (5 , 2) and N (5 , 8), then complete :

      CM = ———— units, MN = ———— units,

      ND = ———— units

      The name of the figure MNDC is ———— and

      The perimeter of the figure MNDC is ———— units.
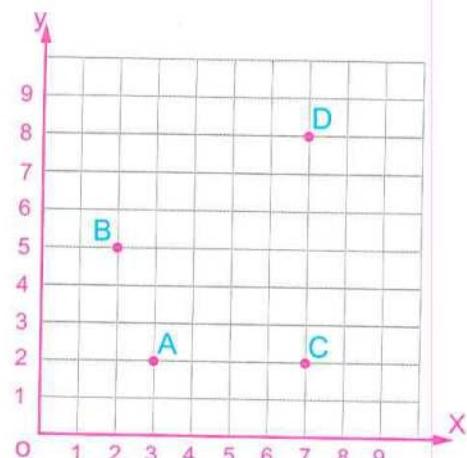
8. 📖 **a. Plot the points on the coordinate grid.**

      A (3 , 2)   B (3 , 5)

      C (6 , 5)   D (6 , 2)

    b. Connect the points in order.

      What polygon did you create ?
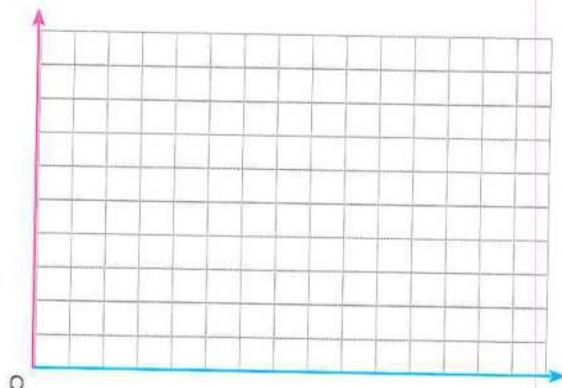
9. In the opposite coordinate plane :

    a. Graph the figure ABCD where

      A (2 , 8) , B (3 , 4) ,

      C (8 , 4) and D (7 , 8)

    b. What is the name of the figure

      ABCD ?

    c. What is the length of $\overline{AD}$?

    d. $\overline{AD}$ // ———— , $\overline{AB}$ // ————
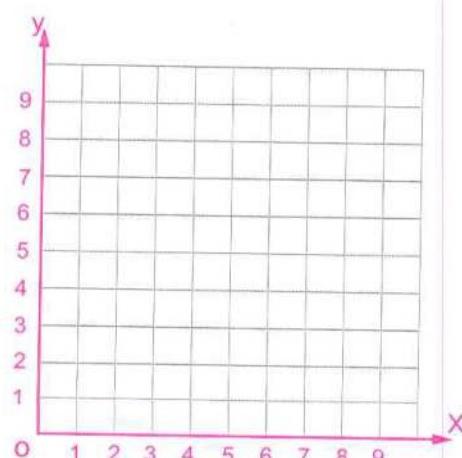
10. In the opposite coordinate plane :

  a. Graph the figure ABCD where

    A (0 , 3) , B (7 , 3) , C (7 , 5) , D (0 , 5).

  b. What is the name of the figure

    ABCD ?

  c. What attributes did you use to identify

    it ?

  d. What line segments in this figure

    are parallel ?

  e. What line segments are perpeudiculer ?
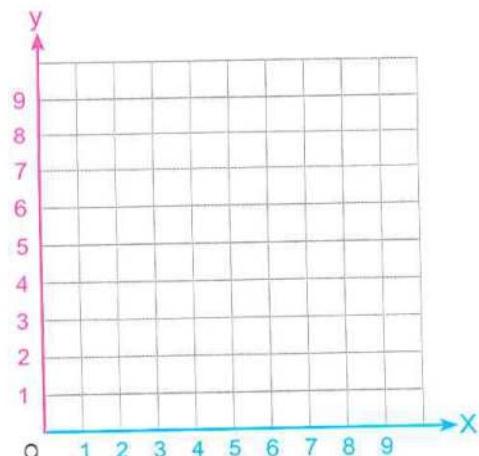
11. Answer the following questions.

  a. What do we call the point (0 , 0) ?

  b. What is the x-coordinate of the origin point ?

  c. What is the y-coordinate of the origin point ?

  d. Is the point (3 , 5) the same as (5 , 3) ?

12. 📖 **Visiting the Pyramids of Giza.**

Use this graph as you complete the related tasks.

Move the given vocabulary words to where they belong on the graph.

Then use what you know about plotting points to complete the remainging tasks.

x-axis   origin   y-axis
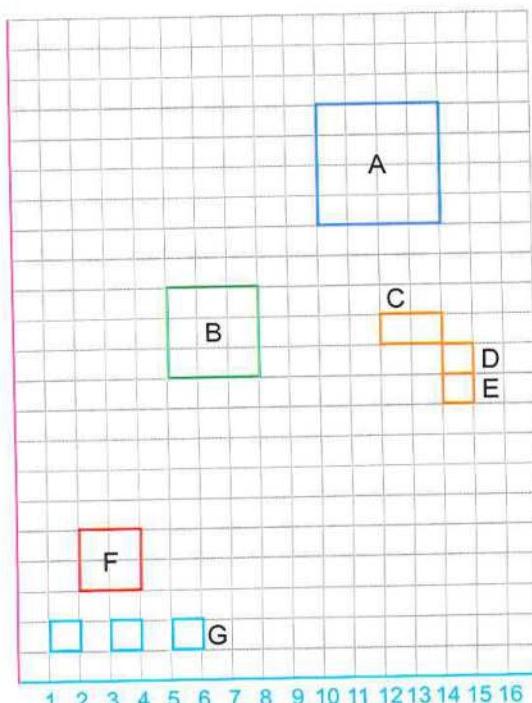
A. Pyramid of Khufu
B. Pyramid of Khafre
C. Sphinx
D. Sphinx Temple
E. Valley Temple
F. Pyramid of Menkaure
G. Pyramids of Queens (3)

  a. Use the vocabulary words to label the coordinate plane.

    x-axis   y-axis   origin

170

b. Start at the origin. Move horizontally on the x-axis 4 units to the right and vertically on the y-axis 5 units up. What structure is located here ?

c. From the origin. move 13 units horizontally on the x-axis and 17 units vertically on the y-axis. What structure is located here ?

d. From the last point, move left on the x-axis 5 units and then down the y-axis 5 units. What structure is located here ?

e. If we move 6 units to the right on the x-axis and zero units on the y-axis from the last point, what structure is located here ?

f. Describe how to move from the Sphinx to the Valley Temple.

g. Locate the Sphinx and the Pyramids of the Queens.

h. Starting at the Sphinx, write directions to Pyramids of the Queens. Use directional words such as horizontally / left / right and vertically / up / down.
Describe how to move using the vocabulary terms x-axis and y-axis.
Remember to begin with directions along the x-axis.

i. Exchange your work with a partner and see if, using your directions, your partner can move from the Sphinx to the Pyramids of the Queens.

13. a. Using the coordinate grid, name the ordered pair that represents the library.
b. Using the coordinate grid, name the ordered pair that represents the park.
c. Using the coordinate grid, name the ordered pair that represents the school.
d. Fill in the blanks : To move from the school to the library, travel to the left of the x-coordinate ———— units. Then, travel up from the y-coordinate ———— units.
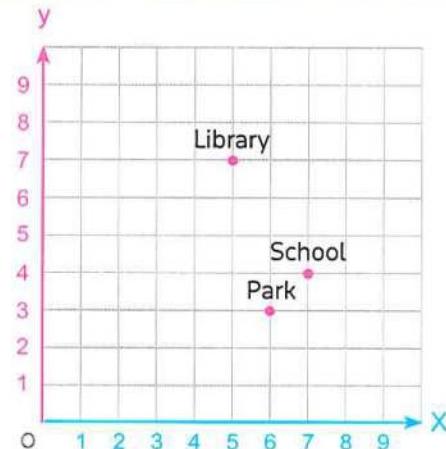
14. The figure shown represents a city designed with the grid plan.

a. A "bird's-eye view" refers to looking down from above. If a bird was to fly directly from Ezz's house to the school, then to the park, and back to Ezz's house, what polygon would its flight path represent ?

b. If the bird was instead, fly from the park to the market before going back to Ezz's house, what polygon would its path represent ?

171
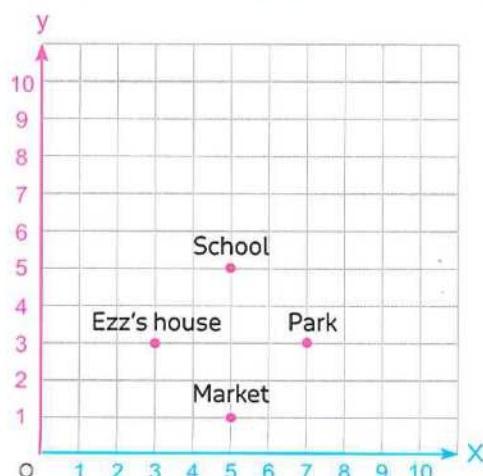
15. 📖 **a.** Record the ordered pairs for point A and B on the coordinate plane.

   b. Draw a line connecting the two points.

   c. Place a coordinate point C to ceate an isosceles right triangle with the right angle at point A. Record the ordered pair on the coordinate plane.
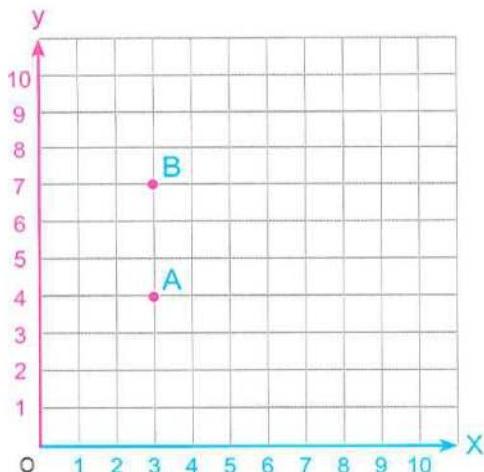
16. **a.** Record the ordered pairs for points A and B on the coordinate plane.

   b. Draw a line connecting the two points.

   c. Place a coordinates points C and D to create a square ABCD. Record the ordered pair on the coordinate plane.
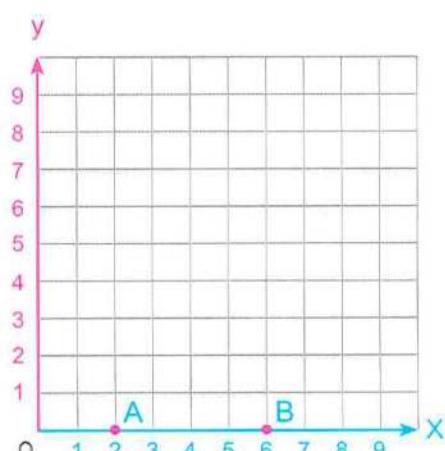
17. 📖 On the coordinate plane, plot and label the given ordered pairs A through J. Then, connect the dots to create a picture. Connect point J to point A to close the shape.

Point A is done for you.
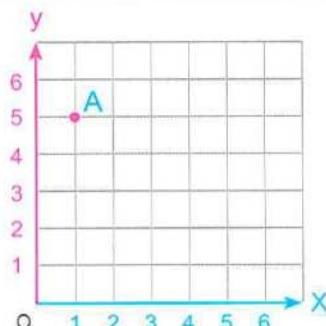
A. (1,5)	C. (5,1)	E. (4,2)	G. (3,3)	I. (2,4)
B. (1,1)	D. (5,2)	F. (4,3)	H. (3,4)	J. (2,5)

172

18. 📖 On the coordinate plane, plot points F, G, and H to make a figure that is symmetrical along the vertical orange line drawn on the coordinate plane. (Point F should follow point E) Connect point H to point A to close the shape. Then, list the coordinates of F, G and H.
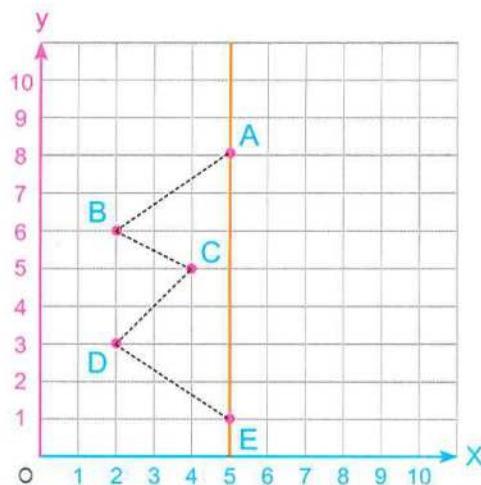
19. 📖 **Look at the zoo map.** The lion and the reptile houses have already been located. Place the Zebra Enclosure and the Snack Shop on the map according to the rules listed.

Rules :

• Zebras must be at least 3 units away from the lions.

• The Snack Shop cannot be closer than 6 units to the reptiles.

• The four structures must create a parallelogram on the zoo map.

Which two points will fit the given criteria ?

a. Zebra Enclosure (4 ,5); Snack Shop (3 ,3)

b. Zebra Enclosure (9 ,6); Snack Shop (7 ,3)

c. Zebra Enclosure (6 ,6); Snack Shop (4 ,3)

d. Zebra Enclosure (6 ,6); Snack Shop (3 ,4)
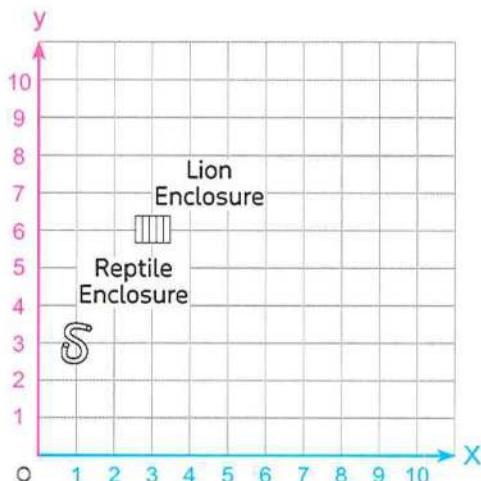
💡 **Challenge**

20. 📖 Choose one of the objects to graph on the coordinate plane by plotting points and connecting these points. List each of the points for your object as a set of ordered pairs.
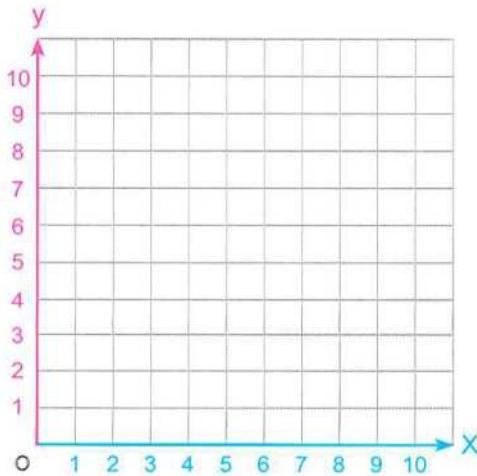
Objects :

A star.

A hexagon.

A house.

A pentagon.

173

Choose the correct answer.

1. The point $(0,3)$ lies on _____

    A. x-axis   **B.** y-axis   **C.** origin point

2. The point $(5,0)$ lies on _____

    A. x-axis   **B.** y-axis   **C.** origin point

3. The ordered pairs which represents $\triangle ABC$ are _____

    A. $(4,2),(4,5),(2,5)$

    B. $(2,4),(4,4),(4,2)$

    C. $(2,4),(4,1),(4,2)$

    D. $(4,4),(4,2),(1,4)$

4. The ordered pairs which represents the rectangle ABCO are _____

    A. $(0,0),(3,0),(2,0),(2,3)$

    B. $(0,0),(0,2),(2,3),(3,0)$

    C. $(0,0),(0,3),(2,0),(2,3)$

    D. $(0,0),(3,0),(2,4),(2,0)$
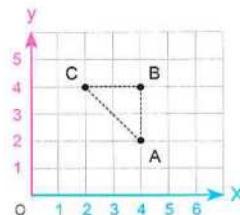
5. The ordered pair which represents an isosceles right-angled triangle at point B is _____

    A. $(1,4)$ **B.** $(3,4)$

    C. $(4,3)$ **D.** $(4,4)$
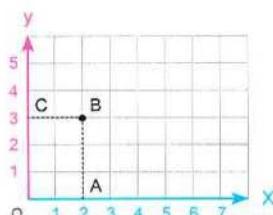
6. **a.** How far is point C from point D?

    A. 2   **B.** 3

    C. 4   **D.** 5
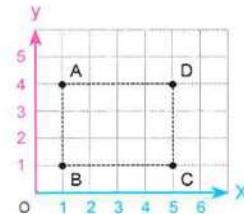
    b. $\overline{AB} \parallel$ _____

    A. $\overline{AD}$ **B.** $\overline{BC}$

    C. $\overline{DC}$ **D.** $\overline{AC}$

    c. $\overline{DC} \perp$ _____

    A. $\overline{AC}$ **B.** $\overline{BC}$

    C. $\overline{BD}$ **D.** $\overline{AB}$

7. Which of the following points located on x-axis?

    A. $(3,0)$ **B.** $(0,5)$

    C. $(3,7)$ **D.** $(10,2)$

8. Without graphing which of the following ordered pairs if connected would form a square?

    A. $(1,3),(1,1),(5,1),(5,3)$ **B.** $(0,0),(0,3),(3,0),(3,3)$

    C. $(1,5),(2,5),(1,1),(2,1)$ **D.** $(0,0),(0,2),(2,0),(2,3)$

From Patterns to Points

Learn ①

Ordered pairs can be represented on a coordinate plane and tables which show x values and y values.

For Example : $(2,3),(3,5),(4,7),(5,9)$

Notice that

- The x values are : 2 , 3 , 4 , 5 , ...
  The values are in a pattern and increase by 1. So, the expected next value is 6

- The y values are : 3 , 5 , 7 , 9 , ...
  The values are in a pattern and increase by 2. So, the expected next value is 11

- The plotted points on a coordinate plane create a line which is called a **line graph**.

- Mathematicians often use **tables** to create ordered pairs that they can graph to look for patterns.
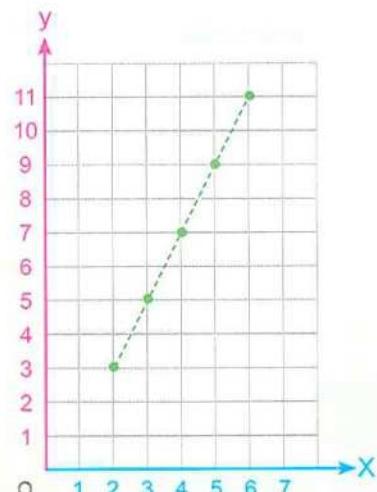
x values	2	3	4	5	⬟
y values	3	5	7	9	⬚

$(2,3)$ $(3,5)$ $(4,7)$ $(5,9)$ $(6,11)$

Example 1

Use the ordered pairs to fill in the table.

$(1,2)$, $(2,3)$, $(3,4)$, $(4,5)$, $(5,6)$

Solution 💡

x values	1	2	3	4	5
y values	2	3	4	5	6

Example 2

Extend the following table and identify the pattern.

x values	0	2	4	6	___	___	___
y values	1	4	7	10	___	___	___

Solution 💡

x values	0	2	4	6	_8_	_10_	_12_
y values	1	4	7	10	_13_	_16_	_19_

- The x values are : 0 , 2 , 4 , 6 , 8 , 10 , 12 in a pattern and increase by 2
- The y values are : 1 , 4 , 7 , 10 , 13 , 16 , 19 in a pattern and increase by 3

Learn ②

Kamal is a designer. He is building a collection of pool in a garden.
In Kamal's design, the pools increase in size. The sketches of his ideas are shown.
The orange tiles represent the outer line around the pool. The green tiles represent the inner units.
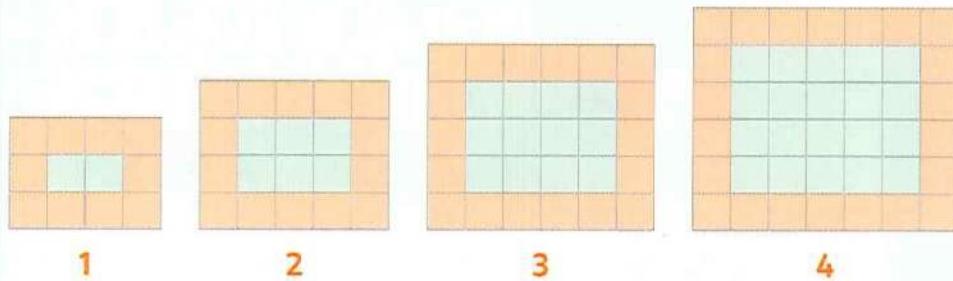
1   2   3   4

The table for orange tiles in designs 1 to 4 can be represented as :

Pool design, x	1	2	3	4	5	6
Number of orange tiles, y	10	14	18	22	26	30

$(22 + 4) (26 + 4)$

The prediction of the design

The table for green tiles in designs 1 to 4 can be represented as :

Pool design, x	1	2	3	4	5	6
Number of green tiles, y	2	6	12	20	30	42

(5×6) (6×7)

The two tables can be represented in one graph by two keys with two colors, each line and color show a table as follows :
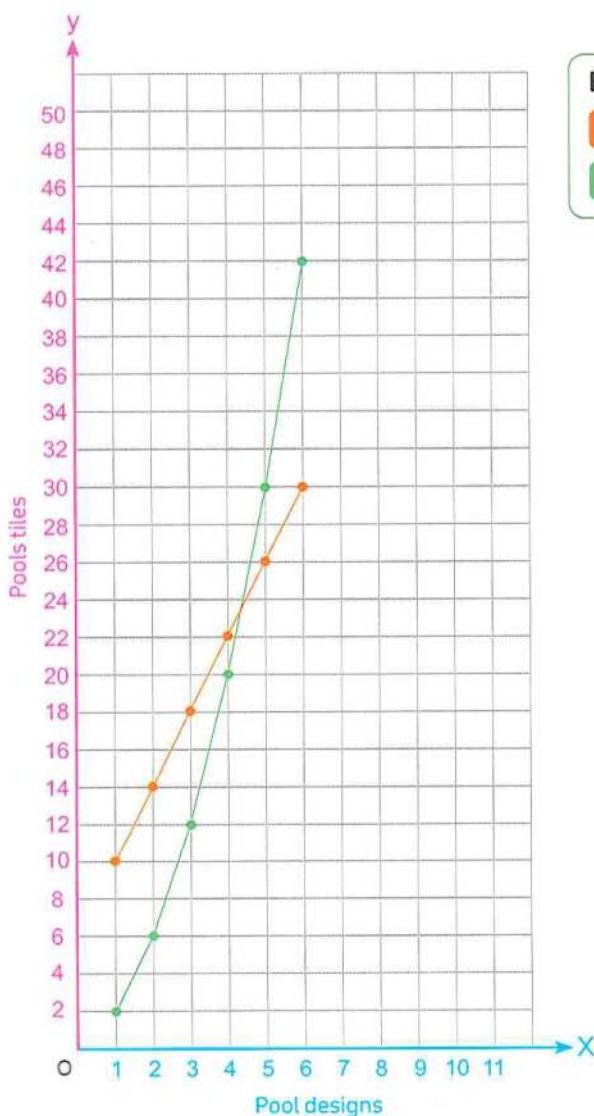
Example 3

Represent the two tables on one graph with two keys.

Design, x	1	2	3	4	5	6
Pattern 1 , y	2	4	6	8	10	12

Design, x	1	2	3	4	5	6
Pattern 2 , y	1	4	9	16	25	36

Solution
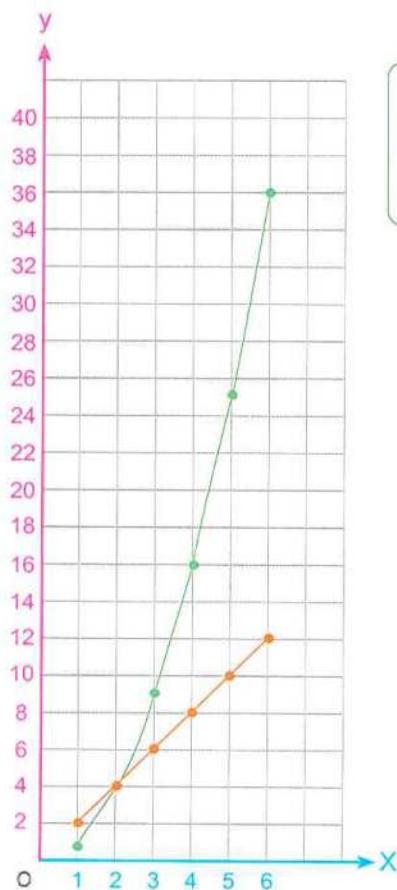
Key :
- Pattern 1
- Pattern 2

The y values in pattern 1 increase by 2

The y values in pattern 2 increase by multiplying each number by itself as

$(1 \times 1), (2 \times 2), (3 \times 3),$ _____

From Patterns to Points

1. Use the ordered pairs to fill in the table.

a. $(0,1),(2,3),(4,5),(6,7)$ and $(8,9)$

x values					
y values					

b. $(1,1),(2,2),(3,3),(4,4)$ and $(5,5)$

x values					
y values					

c. 📖 $(2,4),(3,6),(4,8),(5,10),(6,12)$ and $(7,14)$

x values	2					
y values	4					

2. Extend the following table and identify the pattern of X values and y values.

a.

x values	1	2	3	4	__	__	__
y values	1	2	3	4	__	__	__

b.

x values	10	20	30	40	__	__	__
y values	1	5	9	13	__	__	__

c.

x values	$\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	__	__	__
y values	$1\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	__	__	__

d.

x values	2	4	6	8	__	__	__
y values	36	33	30	27	__	__	__

3. Represent the following tables on the coordinate plane.

a.

x values	1	3	5	7	9	11
y values	5	15	25	___	___	___
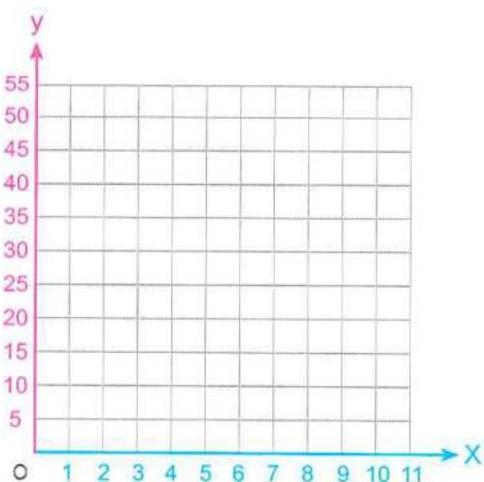
b.

x values	1	2	3	4	5	6	7
y values	3	6	9	___	___	___	___
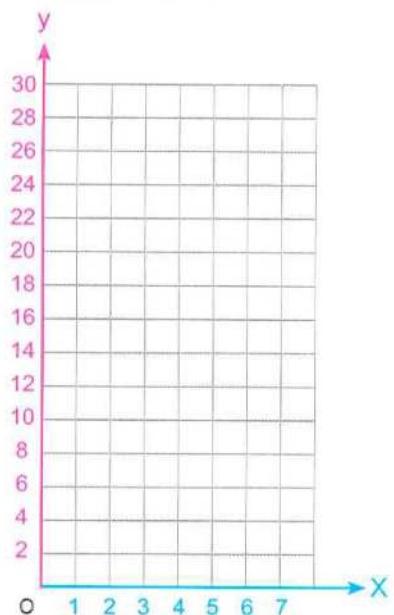
c.

x values	0	5	10	15	20	25	30	35
y values	45	40	35	___	___	___	___	___
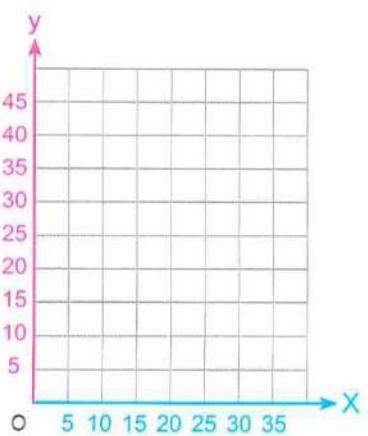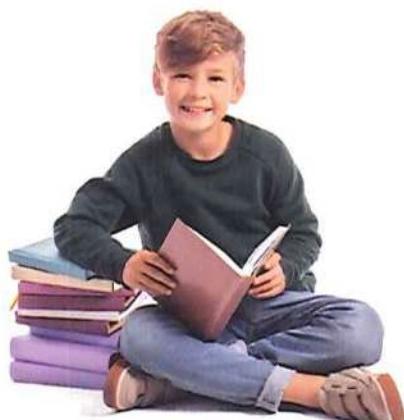
4. Hesham is driving his car, the table shows the distance travelled in 8 minutes when his speed is 60 km per hour. Fill in the missing y values based on the pattern.

Minutes x values	1	2	3	4	5	6	7	8
Travelled km y values	1	2	3	___	___	___	___	___

Graph the coordinate points from the table.
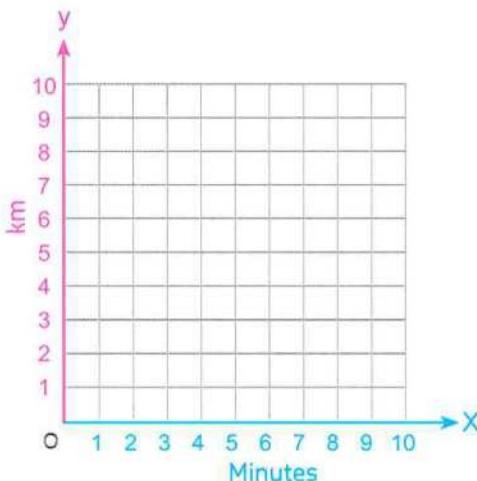
5. 📖 Challenge 1. Look at the table and fill in the missing y values based on the pattern of plant height in Haitham's garden from one week to the next.

Weeks, x	1	2	3	4	5	6
Height of plants, y	$\frac{1}{2}$ cm	2 cm	$3\frac{1}{2}$ cm	___	___	___

Challenge 2. Graph the coordinate points from the Challenge 1 table.
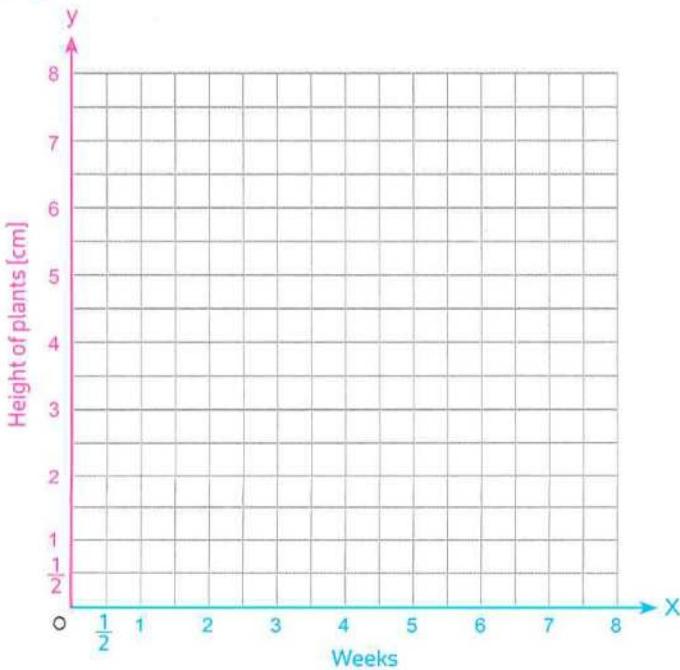
6. The following tables shows the expanded money for 5 days of Wael and Sara.

Represent the two tables on the coordinate grid with two line graphs.

Days, x	1	2	3	4	5
Expand of Wael, y	4	11	15	18	20

Days, x	1	2	3	4	5
Expand of Sara, y	2	10	15	20	25
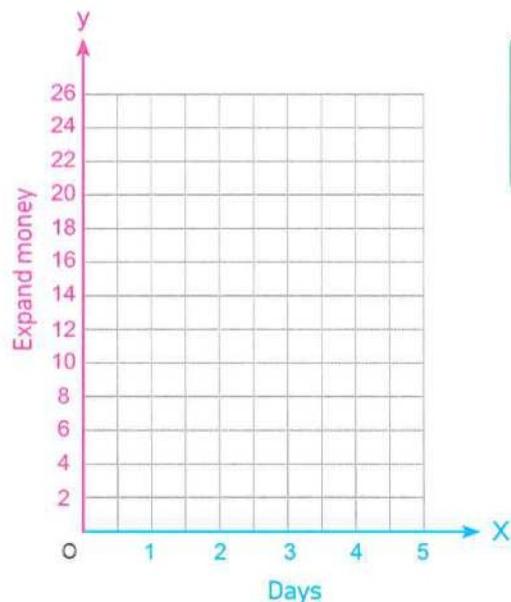
Key :
☐ Wael
☐ Sara

7. Explore the pattern of each table. Complete the missing values of y, then graph the tables of the coordinate plane. Finally describe the two patterns if increase and decrease.

Position	1	2	3	4	5	6	7
Pattern 1	5	8	11	—	—	—	—

Position	1	2	3	4	5	6	7
Pattern 2	30	27	24	—	—	—	—
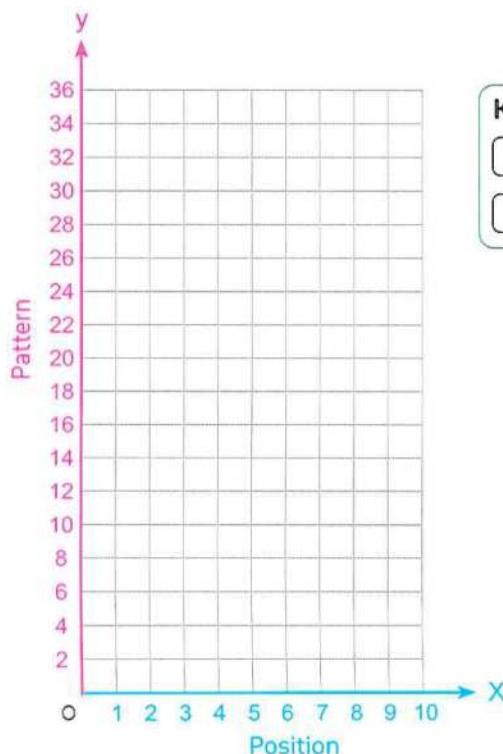
Key :
☐ Pattern 1
☐ Pattern 2

8. 📖 Haitham is a city planner. He is building a collection of square garden beds in a local park. In Haitham's design, the gardens increase in size as you move through the park. Shown are the sketches of his ideas. The yellow squares represent the square tile border around the outside of the garden. The white tiles represent square units of dirt.
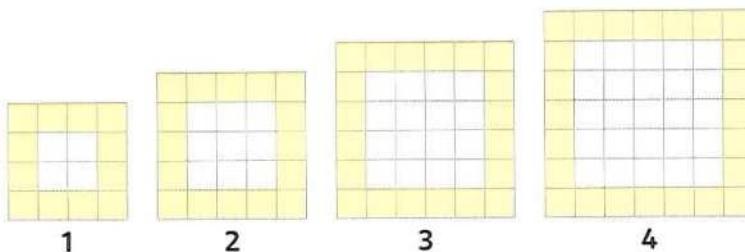
1   2   3   4

a. Fill in the table for the yellow tiles in designs 1 to 4
Then, record your predictions for designs 5 and 6

Garden Design, x	1	2	3	4	5	6
Number of Yellow Units, y	—	—	—	—	—	—

Key:
☐ Square Units around the Garden
☐ Dirt

b. Fill in the table below for the white tiles in designs 1 to 4
Then, record your predictions for designs 5 and 6

Garden Design, x	1	2	3	4	5	6
Number of White Units, y	—	—	—	—	—	—

c. Use the information from the tables you completed to plot the coordinates for designs and number of tiles. Use one color to connect the first set of points and color in the Square Units around the Garden Key with that color. Use a different color to connect the second set of points and color in the Dirt Key with that color. Your finished coordinate grid will have two line graphs.

y — Units of Dirt
x — Garden Designs
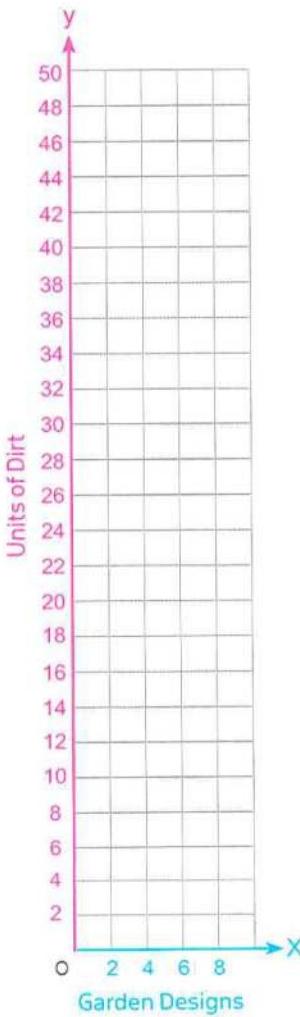
9. 📖 Transportation plays a vital role in city planning. Major cities around the world rely on buses, trolleys, trains, metros, and taxis to move people around. Public transportation usually runs on a set timetable so people can plan their travels based on arrivals and departures. As population increases in different areas, governments respond by creating additional

Minibus

transportation options. In Cairo, some buses are run by the Cairo Transport Authority, while others are smaller minibuses run by private companies.

a. Kamal runs a transportation company and considers adding to his fleet of microbuses. Each bus can hold 15 passengers. **Extend the pattern to complete the table.**

Total Number of Passengers, x	A	30	C	60	E	90	G
Number of Microbuses, y	1	B	3	D	5	F	7

b. Graph the microbus data on the coordinate plane.
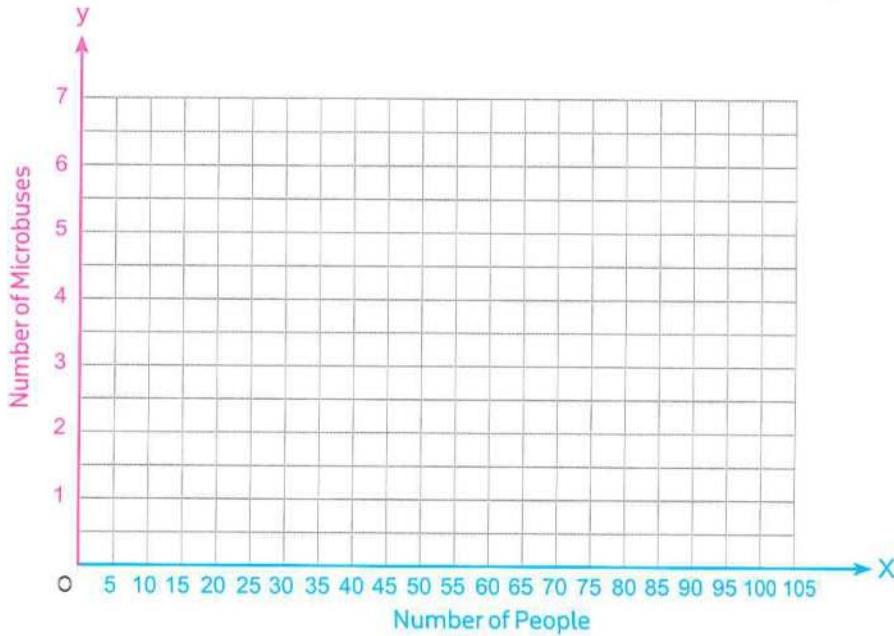
Multiple Choice Questions

Choose the correct answer.

1. The points (2 , 4), (3 , 6) and (4 , 8) can be represented in a table as _____

A.

x	2	6	4
y	4	3	8

B.

x	2	3	4
y	4	8	6

C.

x	2	3	4
y	4	6	8

D.

x	4	6	8
y	2	3	4

2. The values of the missing numbers in the table are _____

x values	1	2	3	4	5
y values	3	6	9	—	—

A. 12 , 14

B. 12 , 15

C. 11 , 15

D. 15 , 18

3. The description of the patterns in the following table is _____

x values	2	3	4	5	6	7
y values	1	3	5	7	9	11

A. x values increase by 1 and y values increase by 1

B. x values decrease by 1 and y values increase by 2

C. x values increase by 1 and y values increase by 2

D. x values increase by 2 and y values decrease by 2

4. The following table can be represented on the coordinate _____

x values	0	1	2	3	4
y values	0	3	6	9	12

A.

B.

C.

D.
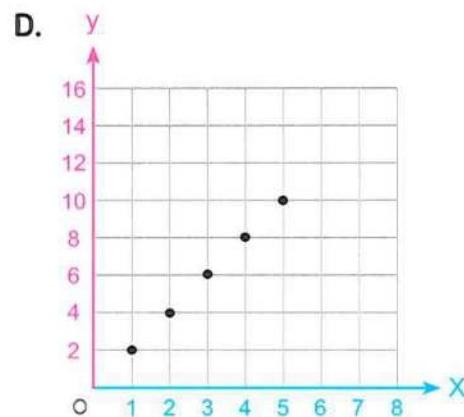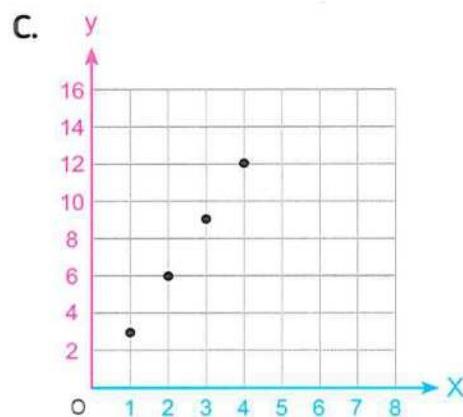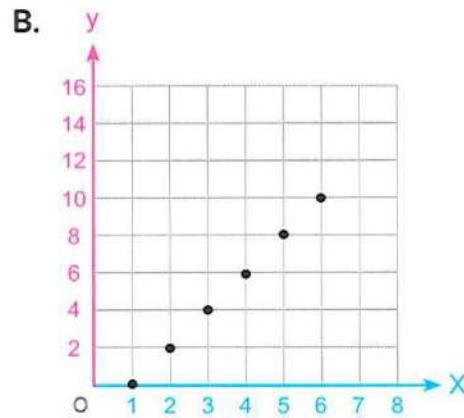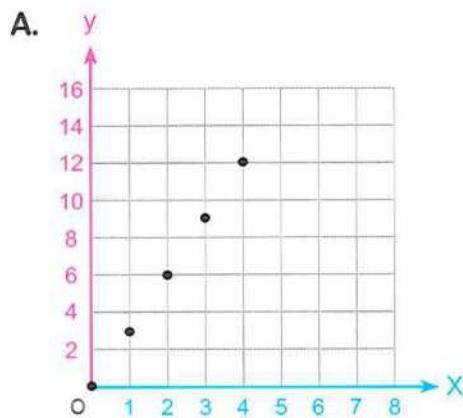
5. The following tables can be represented on the coordinates plane as :

x	1	2	3	4	5
Pattern 1	2	4	6	8	10

x	1	2	3	4	5
Pattern 2	0	4	8	12	16

Key :   ▮ Pattern 1   ▮ Pattern 2

A.

B.

C.

D.

186
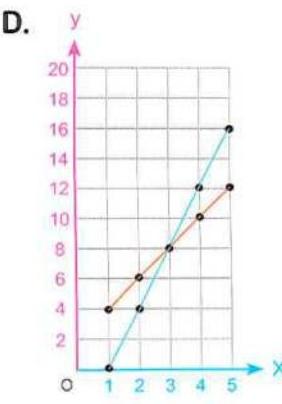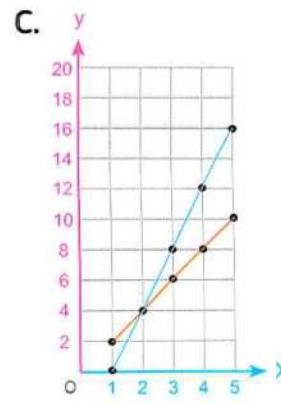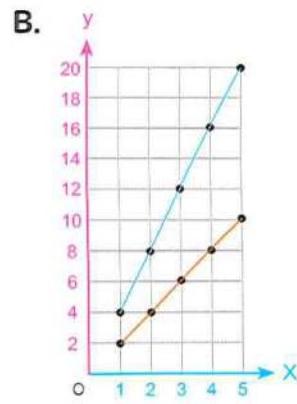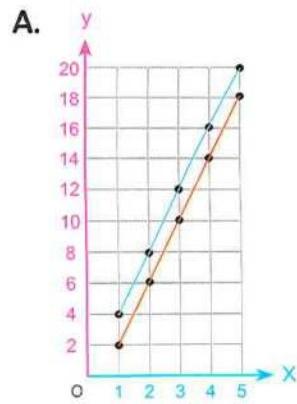
• Graphing Real-World Data
• Interpreting Real-World Graphs

Learn ① Graphing real-world data

A fruiter earns 2 L.E. for each sold kg of oranges, the relation between the number of sold kg (n) and the earned money (m) can be represented by the rule $m = 2 \times n$

, the following table shows that :

Number of sold kg (n)	1	2	3	5	7	8
Earned money (m) in L.E.	2	4	6	10	14	16

Using the data of the number of sold kg as X-coordinates and the data of the earned money as Y-coordinates, plot data on the coordinate grid, then draw a line to connect the points.
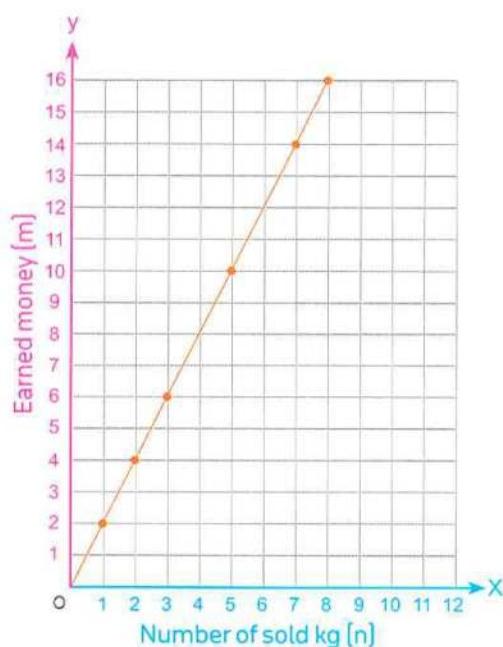
From the previous, we can answer questions like

1. How much money does the fruiter earn when the sold oranges is 4 kg ?
2. How many kg of oranges the fruiter needs to sell to earn 12 L.E. ?

By many methods :

1st method : Using the pattern

Sold kg	1	2	3	④	5	⑥	7	8
Earned money	2	4	6	⑧	10	⑫	14	16

By using the pattern, we can deduce that :

1 The fruiter will earn 8 L.E. if he sells 4 kg of oranges.

2 The fruiter needs to sell 6 kg of oranges to earn 12 L.E.

2nd method : From the graph
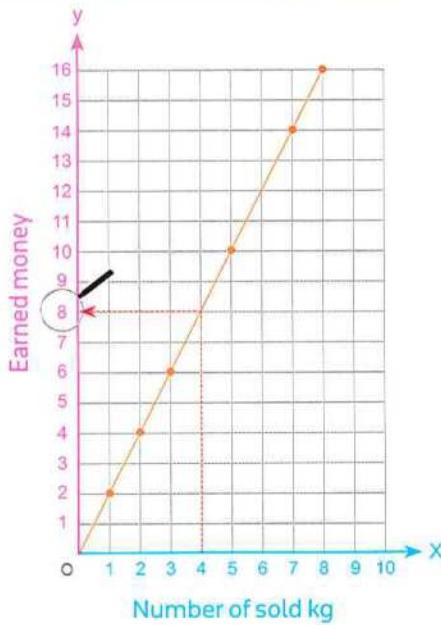
The fruiter will earn 8 L.E.
if he sells 4 kg of oranges
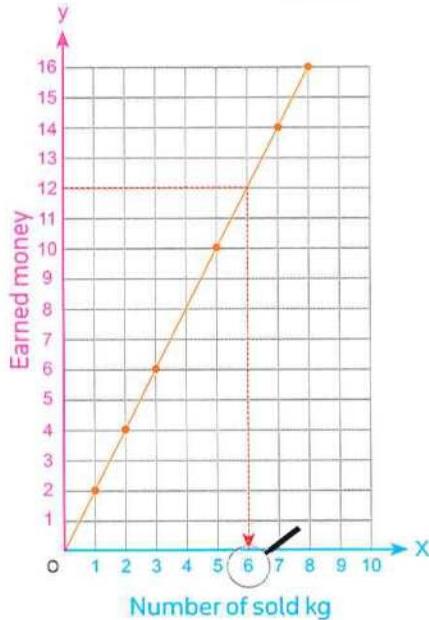
The fruiter needs to sell 6 kg
of oranges to earn 12 L.E.

3rd method : Using the rule

$$m = 2 \times n$$

1 At the sold number of kg $(n) = 4$ kg, then the earned money $(m) = 2 \times 4 = 8$ L.E.

2 To make the fruiter earned money $(m) = 12$, then $12 = 2 \times n \implies n = 6$ kg

i.e. the fruiter needs to sell 6 kg to earn 12 L.E.

188

✓ **Check** your understanding

High-speed train covers 4 km each minute, deduce the relation between the covered distance (S) km and the elapsed time (t) minute, then answer the following :

1. What is the rule that represents the relation between (S) and (t) ?

_____

2. Complete the table :

Elapsed time (t) in minutes	1	2	3	___	5	___
Covered distance (S) in km	4	8	12	___	___	24

3. From the previous table :

   Use the data of the elapsed time as x-coordinates and the covered distance data as y-coordinates, plot the data on the coordinate grid, draw a line to connect the points.
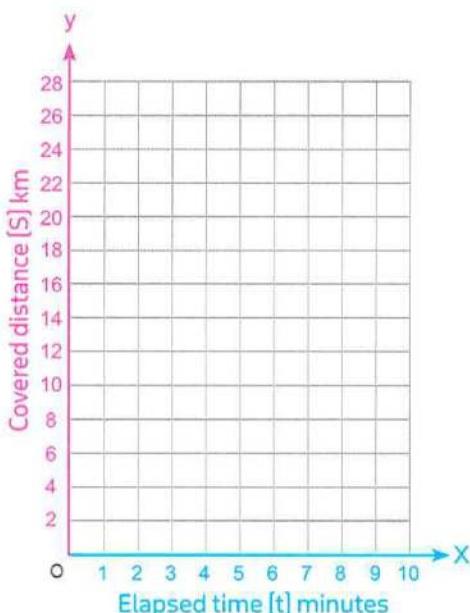
4. What is the covered distance if the elapsed time is 3 minutes ?

_____

5. What is the elapsed time to cover a distance 28 km ?

_____

6. What is the covered distance if the elapsed time is 8.5 minutes ?

_____

189

Learn ② Graphing data of two related tables on the same coordinates plane

For a week, Sameh saves 30 L.E. per day and Wael saves 60 L.E. per day , then you can fill the following two tables.

Sameh (30 L.E. per day)	
Number of days	Total saved money (L.E.)
1	30
2	60
3	90
4	120
5	150
6	180
7	210

Wael (60 L.E. per day)	
Number of days	Total saved money (L.E.)
1	60
2	120
3	180
4	240
5	300
6	360
7	420

- To graph the data of the two tables on the same coordinates plane, you use a different color to represent each person data as the following.

Key :
- Sameh
- Wael
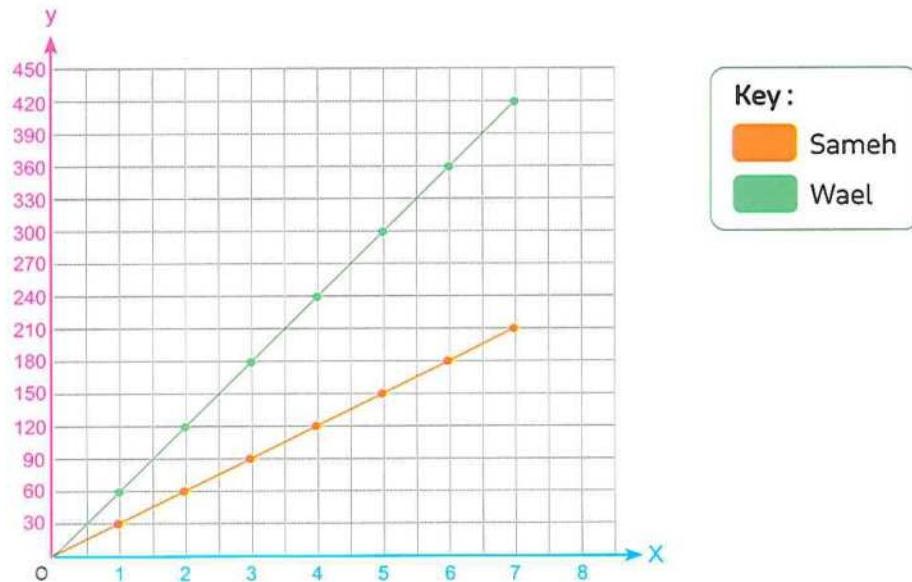
From the graph, you can answer some questions like :

1 At the end of the week, who saved farther ?

➡ Wael saved farther than Sameh.

2 How much farther did he save ?

➡ Since, 420 – 210 = 210, then Wael saved 210 L.E. farther than Sameh.

3 After how many days did Sameh and Wael save 120 L.E. ?

➡ Sameh saved 120 L.E. after 4 days and Wael saved 120 L.E. after 2 days.

190

✓ **Check** your understanding

The seats of children's theatre is divided into two sections, 1st class and 2nd class. The price of the ticket of 1st class is 40 L.E. and of 2nd class is 20 L.E.

1. Use these data to fill the following tables.

1st Class (40 L.E.)	
Number of tickets	Price in (L.E.)
1	40
2	_____
3	_____
4	_____
5	_____

2nd Class (20 L.E.)	
Number of tickets	Price in (L.E.)
1	_____
2	_____
3	_____
4	_____
5	_____

2. Graph these data on the same coordinates plane using a different color to represent each class data and represent the number of tickets on x-coordinate and the price on y-coordinate.

Key :
☐ 1st Class
☐ 2nd Class
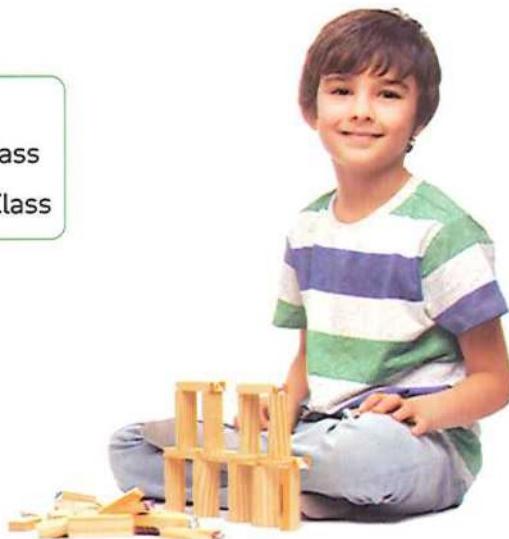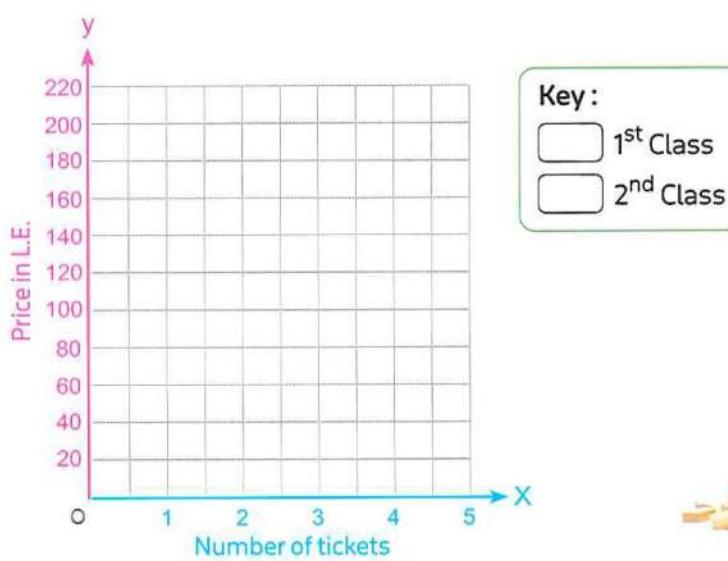
3. From the graph, how many tickets of 1st class or 2nd class can be sold for 80 L.E. ?

_____

Learn ③ Interpreting real-world graphs

Example 1

Two workers stick ceramic tiles and record number of tiles they stuck, the opposite graph shows the total number of tiles that each worker has stuck and the elapsed time in minutes.
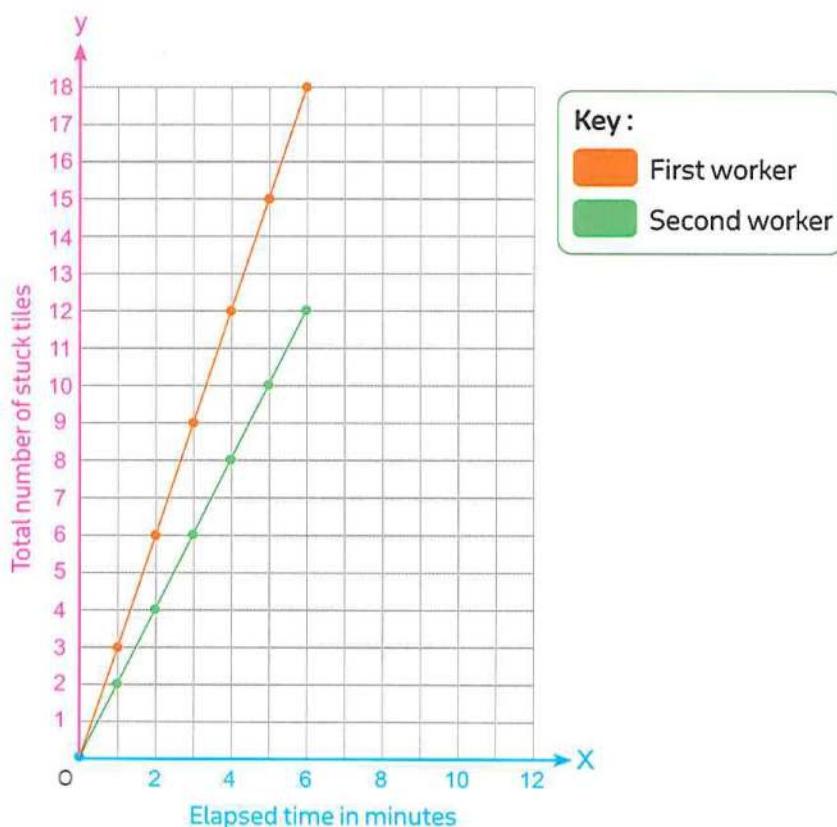
Key:
- First worker
- Second worker

From the graph, answer the following questions:

a. What rule describes the number of stuck tiles by the 1st worker compared to the elapsed time ? then create a data table describe that.

b. What rule describes the number of stuck tiles by the 2nd worker compared to the elapsed time? then create a data table describe that.

c. What is the total number of stuck tiles after 10 minutes where the two workers work together?

Solution 💡

a. The rule :

The number of stuck tiles by the 1st worker

= 3 × elapsed time in minutes.

• The data table :

Elapsed time in minutes	Number of stuck tiles by the 1st worker
1	3
2	6
3	9
4	12
5	15
6	18

b. The rule :

The number of stuck tiles by the 2nd worker

= 2 × elapsed time in minutes.

• The data table :

Elapsed time in minutes	Number of stuck tiles by the 2nd worker
1	2
2	4
3	6
4	8
5	10
6	12

c. After 10 minutes :

• The first worker has stuck : 3 × 10 = 30 tiles

• The second worker has stuck : 2 × 10 = 20 tiles

• The two workers together have stuck = 30 + 20 = 50 tiles

Example 2

Islam travelled by his car from Cairo to Alexandria. He has left home at 6 a.m. He kept trick of the number of kilometers he covered at the end of each hour and record it on the grid as the opposite :
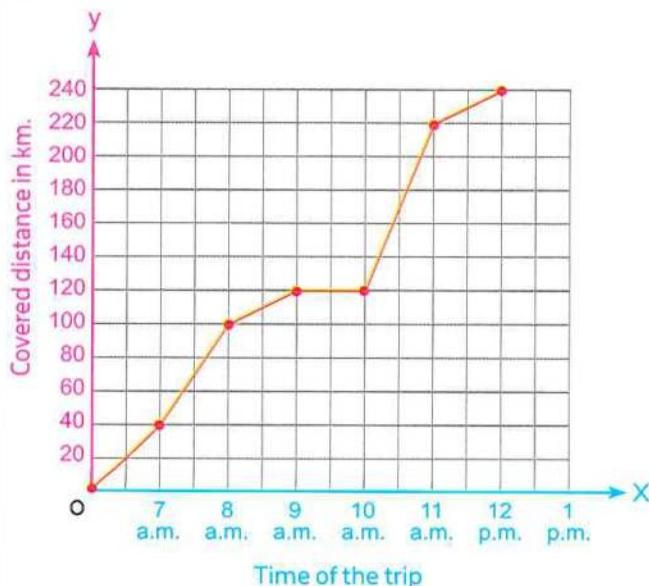
From the graph, answer the following questions :

a. What does the ordered pair (11 , 220) tell us ?

b. What does the horizontal line from 9 a.m. to 10 a.m. mean ?

c. Between which two hours did Islam cover 60 km ?

d. What is the covered distance till 11 a.m. ?

e. During which hour did Islam drive fastest ? How do you know ?

Solution

a. [11 , 220] means at 11 a.m. Islam covered a distance 220 km

b. The horizontal line means Islam took a rest from 9 a.m. to 10 a.m.

c. Between 7 a.m. and 8 a.m. Islam covered 60 km

d. The covered distance till 11 a.m. equals 220 km

e. Islam drove fastest between 10 a.m. and 11 a.m. because he travelled 100 km at this hour.

✔ Check your understanding

On Thursday [the end of the work week] , Shady took 3000 L.E. as a weekly salary, he spent from them each day and saved the remainder at the end of the week, the opposite graph shows how many pounds Shady had at the beginning of each day.
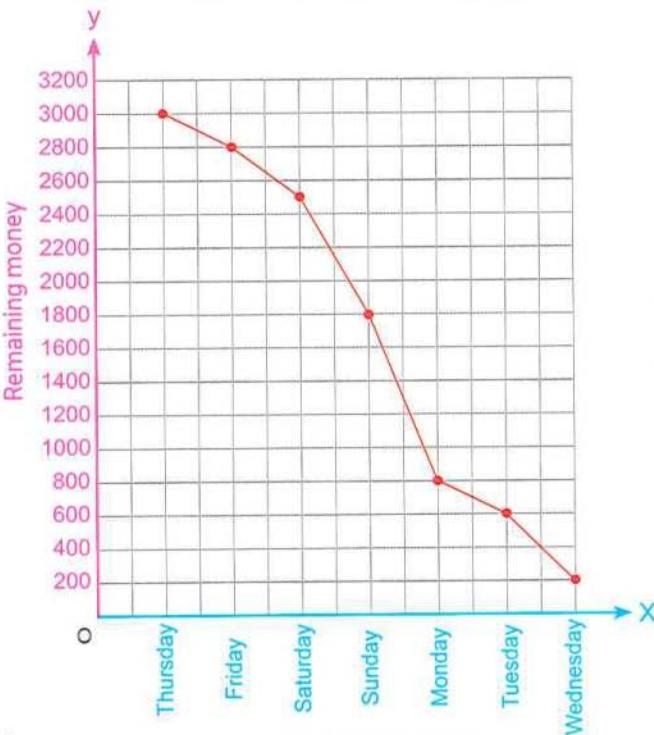
From the graph, answer the following questions.

1. Why are the y values decreasing on the graph ?

2. What does the ordered pair [Saturday , 2500] mean ?

3. At which day did Shady spend most money ?

4. How many pounds did Shady have at the beginning of Monday ?

1. The length of a rectangle is twice its width, in centimeters. This information can be represented by the rule, Length $(l) = 2 \times$ width (w).

   a. Use the pattern to complete the table.

Width, w (cm)	1	2	A	5	C	8
Length, l = 2w (cm)	2	4	8	B	12	D

   b. Using the width data as x-coordinates and the length data as y-coordinates, plot the data on the coordinate grid. Then, draw a line the connect the points.

   c. The width of the rectangle is 3 centimeters.
      The length is _____ cm.

   d. The width of the rectangle is 5.5 centimeters. The length is _____ cm.

   e. The length of the rectangle is 6 centimeters. The width is _____ cm.

   f. The length of the rectangle is 14 centimeters. The width is _____ cm.
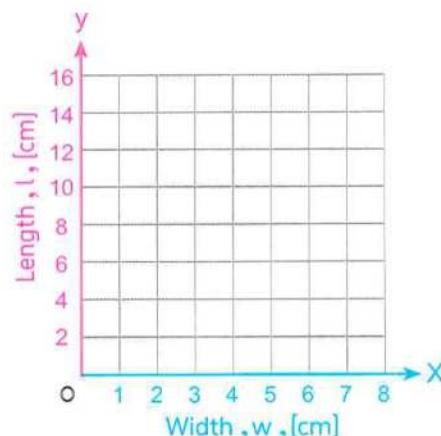
2. Amgad saves daily an amount of pound three times the amount his sister Amal saves.

   a. Write a rule represents these information.

   b. Complete the following table.

Amal saved in L.E. (p)	1	2	—	4	—	8
Amgad saved in L.E. (l)	3	6	9	—	18	—

   c. Using Amal saved money data as x-coordinates and Amgad saved data as y-coordinates, plot data on the coordinate grid then draw a line to connect the points.

195
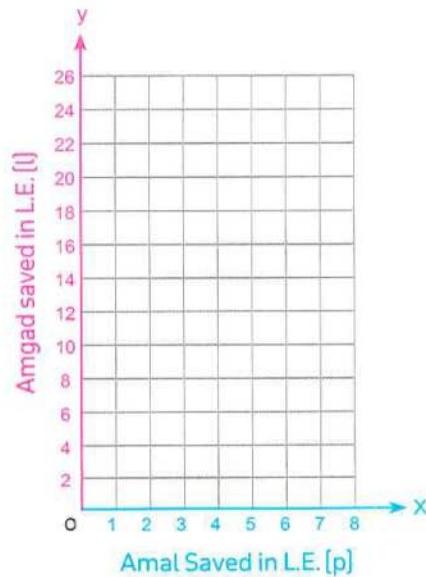
3. A car consumes one litre of petrol to cover a distance 10 km, complete the following table and then graph the points on the grid.

a.

Consumed petrol in litre	Covered distance in km
1	————
3	————
4	————
————	60
————	80
9	————

b.
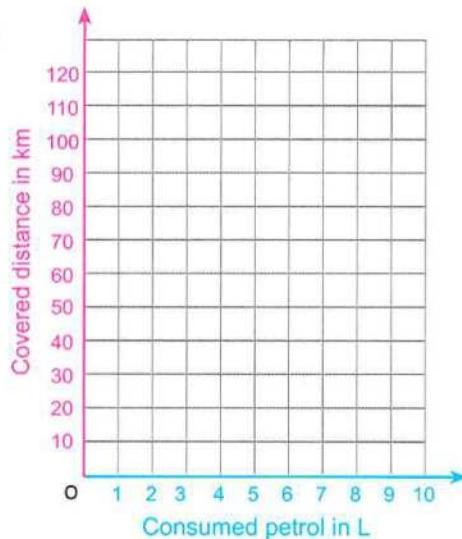
c. How many litre of petrol are needed to cover 120 km ?

4. 📖 Ola is selling bags of cookies in her neighborhood to make extra money to buy a new bike. She earns 5 L.E. for each bag of cookies she sells. Complete the table and then graph the points on the coordinate grid.

Bages of Cookies	Money Earned L.E.
2	————
4	————
7	————
8	————
10	————

196
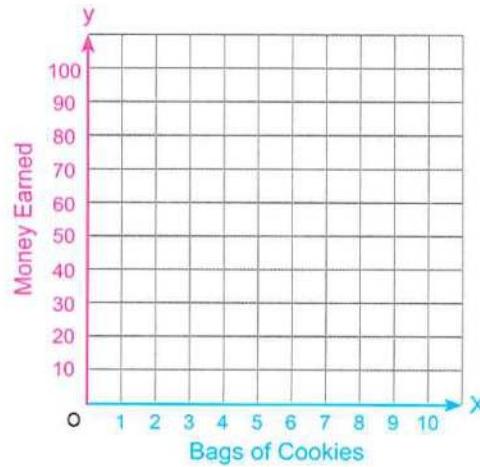
5. 📖 Nabil and Osman are in a 5-hour bike race. Nabil is traveling at a rate of 30 kilometers per hour. Osman is traveling at a rate of 60 km/hr

Use the information to complete the tables.

a.

Nabil (30 km/hr)	
Number of Hours	Total Distance (km)
1	———
2	———
3	———
4	———
5	———

b.

Osman (60 km/hr)	
Number of Hours	Total Distance (km)
1	———
2	———
3	———
4	———
5	———

c. Graph the data from your table on the coordinate plane. Use a different color to represent each biker's data. Remember to label the x-axis and the y-axis and determine the scale for each axis.

d. At the end of the race, who traveled farther?

e. How much farther did he travel?

f. The boys biked 120 kilometers at different times. How long did it take each of them?
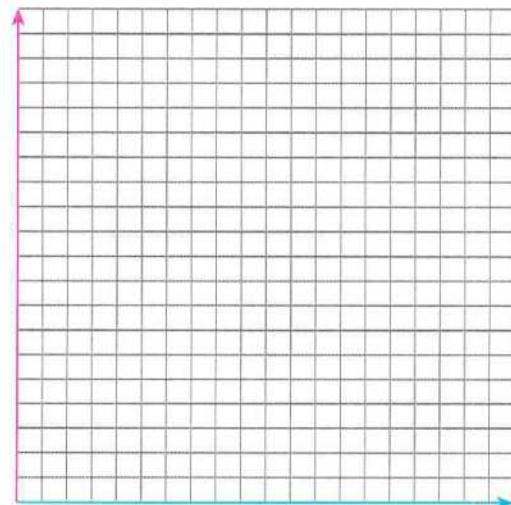
6. In the gym, Usama and Maged are playing the game cord where Usama jumps 30 jumps each minute and Maged jumps 40 jumps each minute , use that information to complete the following tables.

a.

Usama (30 jumps/min)	
Time in minutes	Total number of jumps
1	———
2	———
3	———
4	———
5	———
6	———

b.

Maged (40 jumps/min)	
Time in minutes	Total number of jumps
1	———
2	———
3	———
4	———
5	———
6	———

197

c. Graph the data from your table on the
coordinate plane. Use different color to
represent each player data. Remember
to lable the x-aixs and y-axis and
determine the scale for each axis.

d. After 5 minutes from starting
jumping, who jump farther?

e. The two players jumped 120 jumps
at different times, what are them?

---
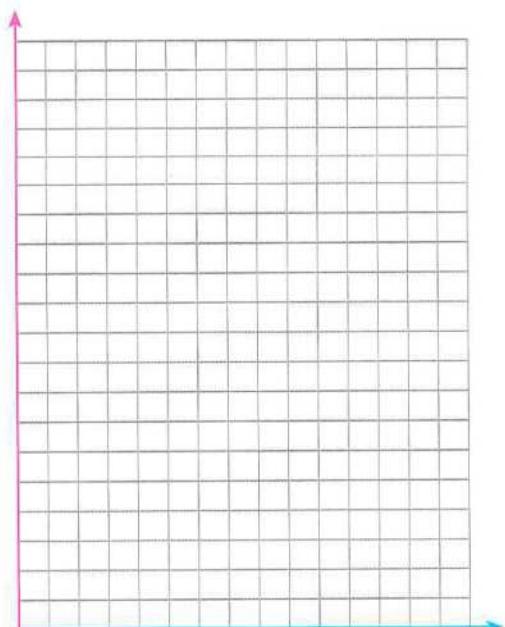
7. 📖 The table shows meerkat growth in the Kalahari of South Africa during their
first 20 months of life. Graph the data on a coordinate plane and then connect the points
with line segments.

Time in Months	0	2	4	6	8	10	12	14	16	18	20
Units of Height	3	5	6	7	8	9	10	12	12	12	12

Meerkat Height in Units Over First 20 Months

a. What does the point
(0 months, 3 units) mean
for a typical meerkat's height?

b. How tall do you think
a typical meerkat gets?
Why do you think so?

c. At what age do meerkats
reach their full height?
How do you know from
this graph?
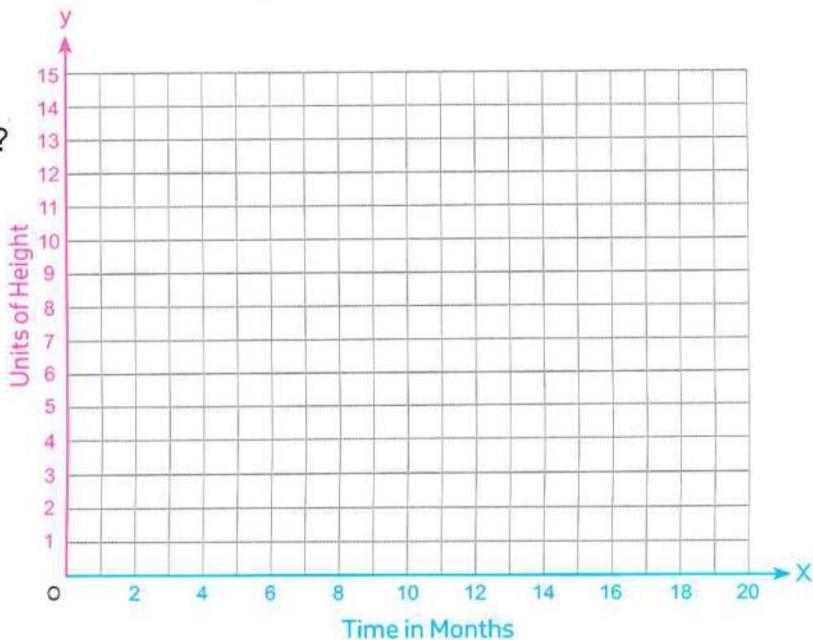
8. 📖 Developers in cities need permits to construct buildings. A developer in downtown Cairo is trying to decide whether he should build an office building with 8 offices per floor or 12 offices per floor. How could the developer use the table and a coordinate plane to help him analyze data and make decisions about the height of the building he will construct ? **Use words and numbers to support your thinking.**

Number of floors	8 offices per floor	12 offices per floor
0	____	____
1	____	____
2	____	____
3	____	____
4	____	____

9. 📖 **Yasmeen and Sherif record the kilometers they run. The graph shows the total distance that each person has run.**

a. What rule describes Yasmeen's total kilometers compared to the total days she has run ? You may create a data table to help you, if needed.

Key:
🟧 Sherif
🟩 Yasmeen

b. What rule describes Sherif's total kilometers compared to the total days he has run ? You may create a data table to help you, if needed.

199
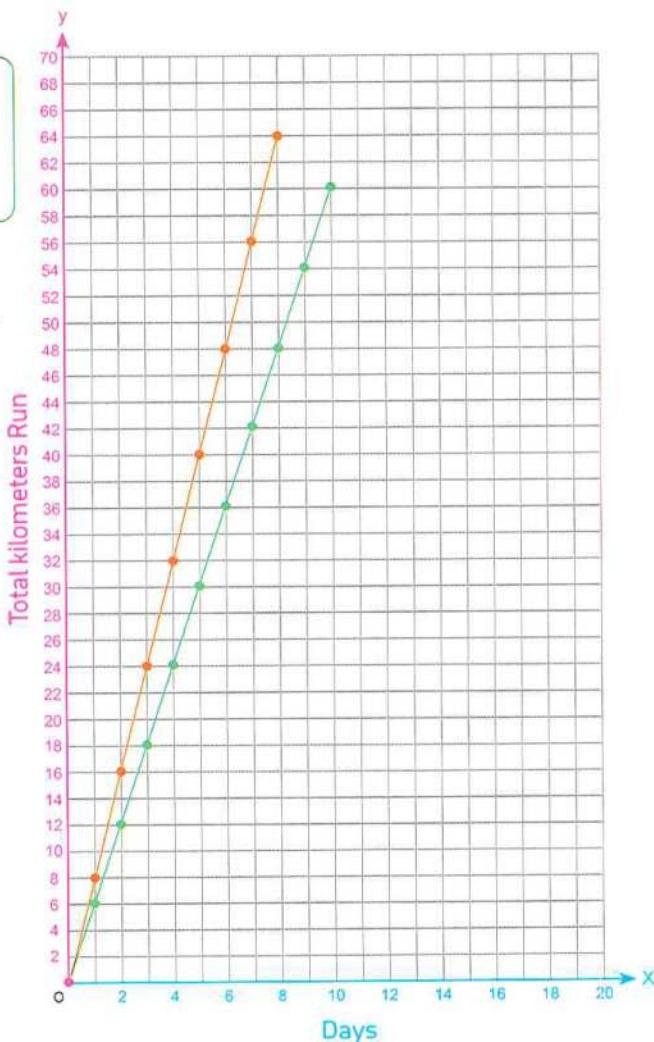
10. Nancy and Bassma record number of english words they save daily, the following graph shows the total number of english words that each person has saved.

a. What rule describes Nancy total saved words compared to the number of days ? from it create a data table.

b. What rule describes Bassma total saved words compared to the number of days ? from it create a data table.

c. After how many days, each of them save the same number of words and what is this number ?

Key :
■ Nancy
■ Bassma

d. At the fourth day what is the difference between Nancy saved words and Bassma saved words ?

---
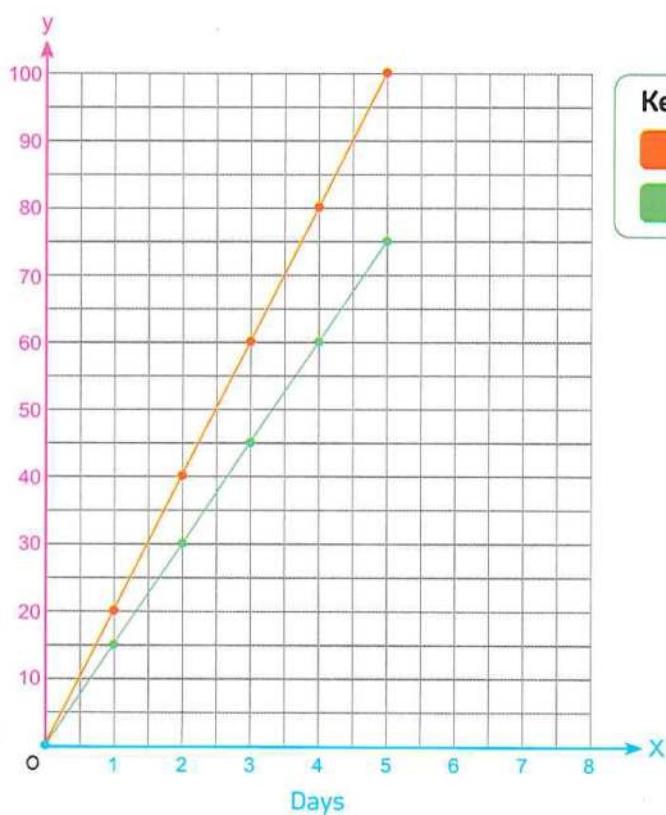
11. 📖 Ehab left his home at 6 a.m. to go on a bike ride. He kept track of the number of kilometers he biked at the end of each hour and recorded it on the grid. Use the coordinate grid to solve the problems.

a. What does the ordered pair (9 , 14) tell us ?

b. Did Ehab ride more kilometers before or after his break ? Explain.

c. Between which two hours did Ehab ride 4 kilometers ?

d. During which hour did Ehab ride the fastest ? How do you know ?

200
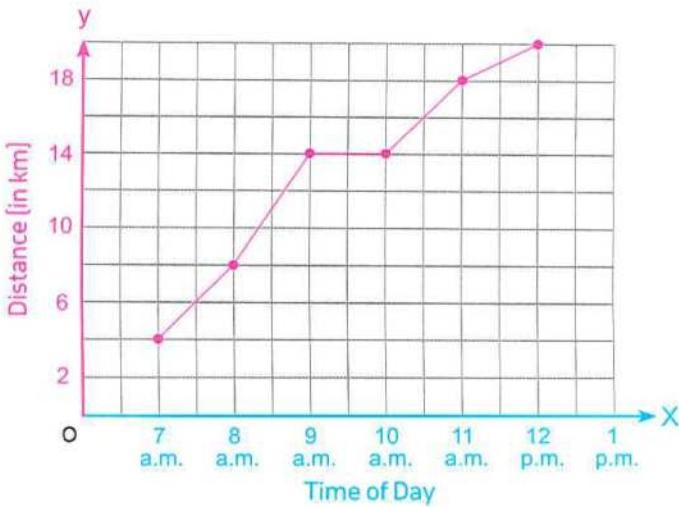
12. 📖 Mounir sells dates at a local market. Each case contains one dozen dates. On Day 1, he had 30 cases to sell. This graph shows how many cases he had at the beginning of each day. Use the coordinate grid to answer the questions.

Mounir's Date Shop

a. Why are the y values decreasing on the graph ?

b. What does the ordered pair (2 , 27) mean ?

c. On which day did Mounir sell the most dates ? How do you know ?

d. How many dates did Mounir have left to sell on Day 7 ?

e. How many individual dates has Mounir sold from Days 1 Through 7 ?

f. Why do you think the line drops so sharply from Days 3 to 5 ?

13. 📖 This coordinate grid shows the approximate population of Cairo between 1950 and 2020 and the city's predicted population in 2030. Reflect on the data on the grid. **Then, answer the question. How might city planners use this data to inform the work they do to improve transportation, housing, and access to goods and services ?**

Population Growth in Cairo between 1950 and 2020 (in millions)
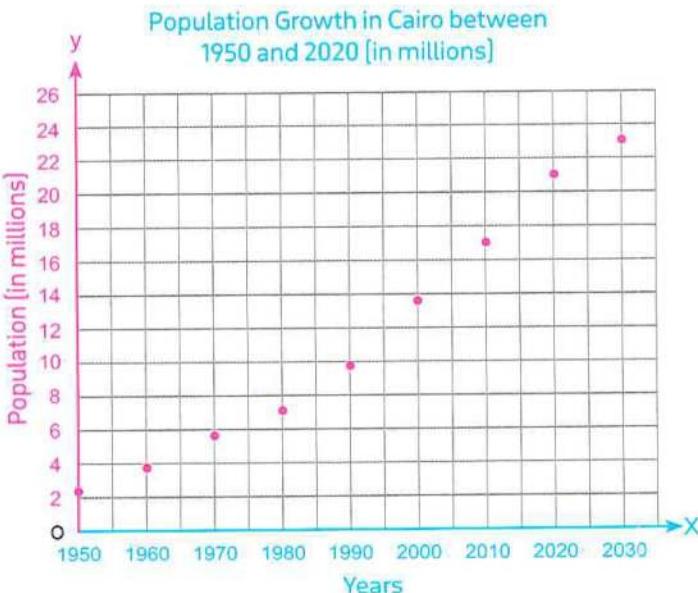
Unit Ten Assessment

1. Choose the correct answer.

a. The triangle whose side lengths are ————— is an isosceles triangle.

   A. 7 cm , 7 cm , 7 cm   **B.** 5 cm , 7 cm , 5 cm

   C. 4 cm , 5 cm , 3 cm   **D.** 8 cm , 6 cm , 9 cm

b. The area of rectangle of length $\frac{3}{4}$ cm and width $\frac{2}{5}$ cm is ————— cm^2

   A. $\frac{1}{4}$ **B.** $\frac{5}{9}$ **C.** $\frac{3}{10}$ **D.** $\frac{2}{3}$

c. The X–coordinate in ordered pair (3 , 2) is —————

   A. 3   **B.** 2   **C.** 5   **D.** 6

d. The value of the missing numbers in the following table is —————

x values	2	3	4	5	6
y values	2	4	6	———	———

   A. 7 , 9   **B.** 8 , 10   **C.** 6 , 8   **D.** 10 , 12

e. The polygon which has only one pair of parallel sides is called —————

   A. trapezium   **B.** parallelogram   **C.** rhombus   **D.** square

f. The opposite triangle is —————

   A. acute   **B.** right

   C. obtuse   **D.** equilateral

g. The measure of any angle of the square = ————— °

   A. 60   **B.** 90   **C.** 100   **D.** 180

---
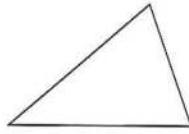
2. Complete.

a. The four sides are equal in length in ————— and —————

b. The triangle XYZ is an equilateral triangle whose perimeter is 18 cm , then XY = ————— cm

c. In the opposite number line :

The value of D is —————
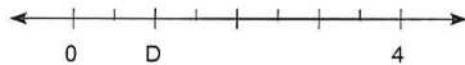
d. **In the opposite figure :**

The ordered pairs that

represent the

point A is ─────────
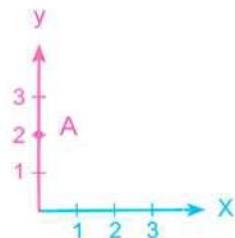
e. Each two opposite sides are parallel

in ───────── , ───────── , ───────── and ─────────

f. The triangle opposite

is ───────── – angled triangle.
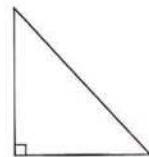
g. The point (0 , 7) lies on ───────── – axis.

h. In any triangle, there are two ───────── angles at least.

---

3. **Choose the correct answer.**

a. If the area of rectangle is 2 square meters and one of its dimensions is $\frac{1}{2}$m, then the other dimension is ─────────

    A. 1 m   **B.** 2 m   **C.** $2\frac{1}{2}$ m   **D.** 4 m

b. ABC is an equilateral triangle. If two side lengths of it are 6.5 cm and 6.5 cm, then the third side is ───────── cm.

    A. 13   **B.** 2.25   **C.** 6.5   **D.** 7

c. The hexagon has ───────── sides.

    A. 4   **B.** 5   **C.** 6   **D.** 7

d. The y-coordinate in the ordered pair (6.5 , 6.2) is ─────────

    A. 6.5   **B.** 6.2   **C.** 12.7   **D.** 0.3

e. The area of a square of side length 2.5 cm is ───────── cm^2

    A. 6.25   **B.** 5   **C.** 10   **D.** 0.5

f. The subcategories of square and rhombus is ─────────

    A. 4 right angles   **B.** 4 equal sides

    C. 2 acute angles   **D.** 2 obtuse angles

g. Which of the following points located on x-axis ?

    A. (4 , 0)   **B.** (0 , 4)   **C.** (4 , 5)   **D.** (5 , 4)

4. **Answer the following.**

   a. Ahmed owns a parking lot. The lot is 4 kilometers long and $3\frac{1}{2}$ km wide. What is the area of the parking lot ?

   _____

   b. Ahmed is making a design using a quadrilateral of 4 right angles.
      Write its name.

   _____

   c. Yehia and Paula are in a 5-hour bike race. Yehia is travelling at a rate of 40 kilometers per hour. Paula is travelling at a rate of 50 km/hr

   (1) Use that information to complete the tables.

   Yehia [40 km/hr]

Number of Hours	Total Distance [km]
1	
2	
3	
4	
5	

   Paula [50 km/hr]

Number of Hours	Total Distance [km]
1	
2	
3	
4	
5	

   (2) Graph the data from your table on the coordinate plane. Use a different color to represent each biker's data. Remember to label the x-axis and the y-axis and determine the scale for each axis.

UNIT 11

Volume

» **Concept 1 :** Understanding Volume and Capacity
» **Concept 2 :** Measuring Volume

Did You Know?!

The United Nations Building is a famous building in New York. It is in the shape of *cuboid*.

Understanding Volume and Capacity

Lesson No.	Lesson Name	Learning Objectives
Lessons 1&2	Multiple Dimensions	• Students will name three-dimensional figures. • Students will identify attributes of three-dimensional figures. • Students will define volume and capacity
	Measuring a New Dimension	• Students will explain why volume and capacity are attributes of three-dimensional figures. • Students will relate the dimensions of solid figures to measuring volume. • Students will use cubic units to describe the volume of models and drawings.
Lessons 3&4	Estimating and Measuring Volume	• Students will estimate the volume of rectangular prisms in unit cubes. • Students will use unit cubes to measure the volume of rectangular prisms.
	Same Volume, Different Shape	• Students will use unit cubes and models to create right rectangular prisms with a given volume.

- **Multiple Dimensions**
- **Measuring a New Dimension**

Learn ① Three-dimensional figures

- Solid figures have length, width, and height. They are also called **three-dimensional figures**.

height | width | length
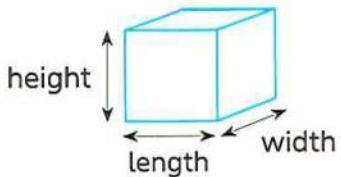
Problem

Jodie's grandmother gave her a charm bracelet and asked her to name each charm on her bracelet.

Answer:
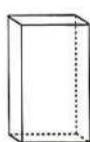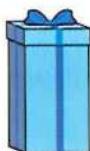
Rectangular prism (Cuboid)	Cube
Sphere	Cone
Cylinder	Square pyramid
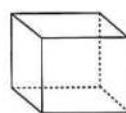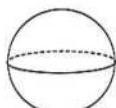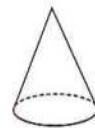
Two-dimensional shapes

Square

Rectangle

Triangle

Circle

Three-dimensional figures

Cube

Rectangular Prism (cuboid)

Pyramid

Sphere

Cone

Cylinder
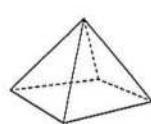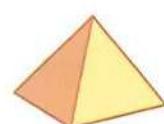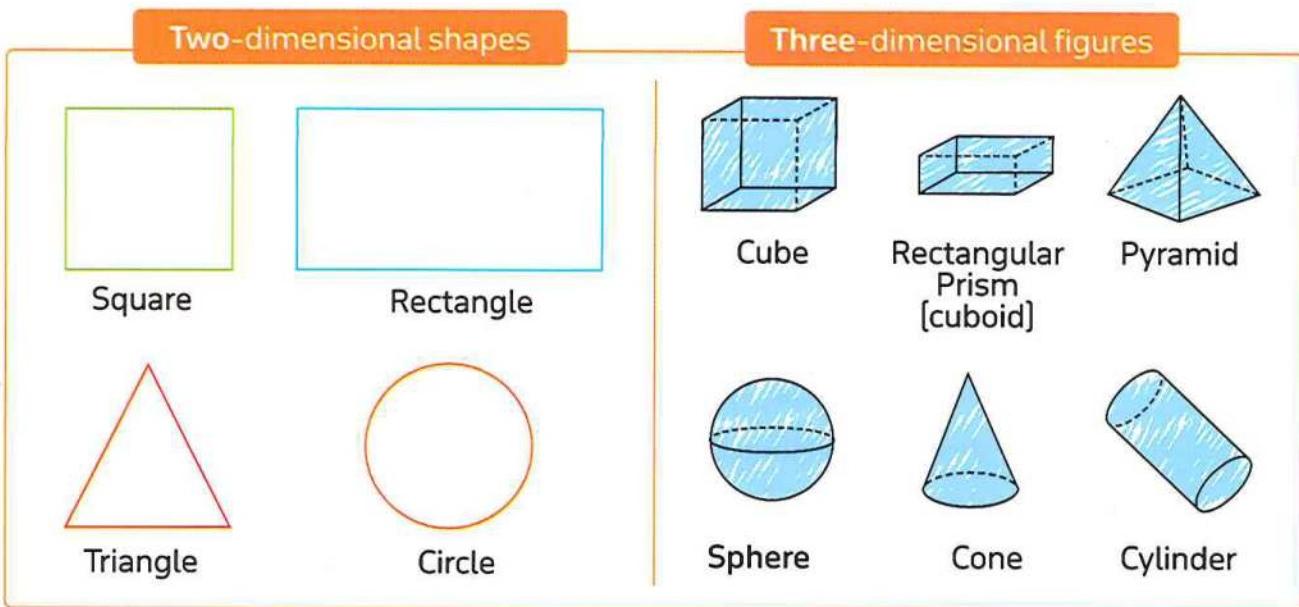
✓ **Check** your understanding

Name the solid figure that each object looks like

a.

b.

c.

d.

e.

f.

How to describe the three-dimensional figure ?

You can describe the three-dimensional figure using some vocabulary "face - edge - vertex"

A **face** is a flat surface of a solid figure.

An **edge** is the line segment formed where two faces meet.

A **vertex** is a point where three or more edges meet.

The plural of vertex is vertices.

edge

face

vertex
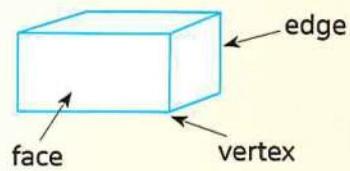
Notice

Some three-dimensional figures have curved surfaces.
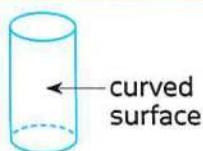
curved surface

208
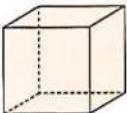
	Name	Picture	Face/Base Shape[s]	Number of Faces/Bases	Number of Edges	Number of Vertices
			Attributes of Three-Dimensional Shapes			
1	Cube		Square	6	12	8
2	Cone		Circle	1	0	1
3	Cylinder		Circle	2	0	0
4	Rectangular Prism [Cuboid]		Rectangle and square	6	12	8
5	Sphere		No face	0	0	0
6	Square Pyramid		Triangle and square	5	8	5
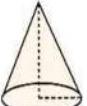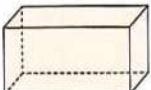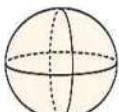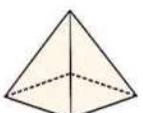
✓ **Check** your understanding

Write how many faces, edges and vertices are there.

a. Sphere
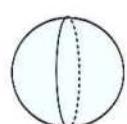
- _____ vertices.
- _____ flat faces.
- _____ edges.

b. Square-based pyramid
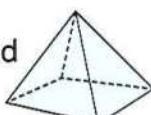
- _____ vertices.
- _____ flat faces.
- _____ edges.

c. Cube
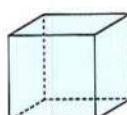
- _____ vertices.
- _____ flat faces.
- _____ edges.

Learn ② Drawing three-dimensional designs with dots
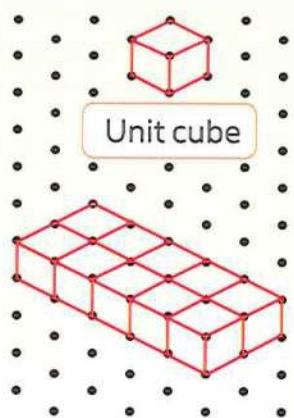
Unit cube
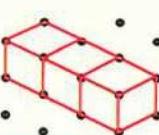
Three cube units
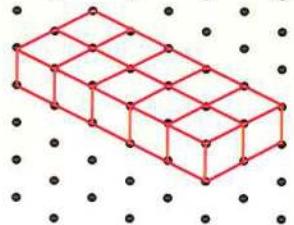
* 1 cube high
* 5 cube long
* 2 cube wide
* volume = 10 cubes
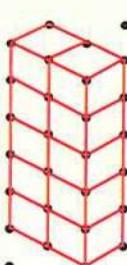
* 5 cubes high
* 2 cubes long
* 1 cube wide
* volume = 10 cubes

✓ Check your understanding

Draw a design of volume.

a. 3 cube units

b. 6 cube units

c. 12 cube units

1. Name the solid figure that each object is shaped like.

a.

b.

c.

d.

e.

_____   _____   _____   _____   _____

---

2. 📖 Look at the images of buildings around the world, then choose the name of each building's shape to the building.

a. La Géode-Paris

A. Cube
B. Cone
C. Cylinder
D. Sphere
E. Rectangular prism
F. Square pyramid

b. Dashur Pyramids-Egypt
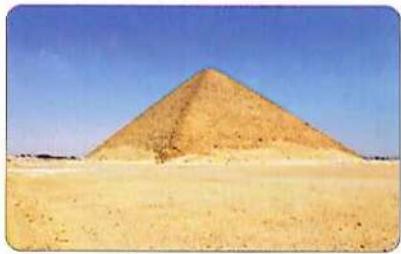
A. Cube
B. Cone
C. Cylinder
D. Sphere
E. Rectangular prism
F. Square pyramid

c. El Gezira tower (also known as Borg El Qahera)-Egypt

A. Cube
B. Cone
C. Cylinder
D. Sphere
E. Rectangular prism
F. Square pyramid

d. Modern Building-Australia
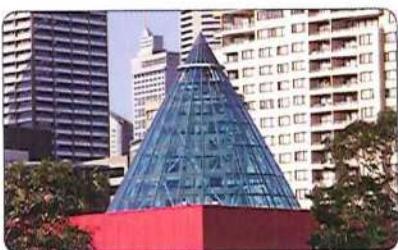
A. Cube
B. Cone
C. Cylinder
D. Sphere
E. Rectangular prism
F. Square pyramid

e. The Red Chapel of Hatshepsut-Egypt
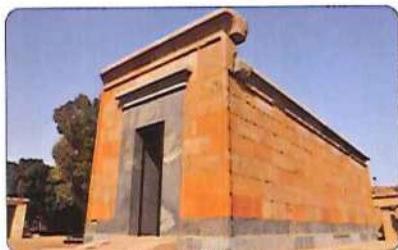
A. Cube
B. Cone
C. Cylinder
D. Sphere
E. Rectangular prism
F. Square pyramid

f. Stuttgart City Library-Germany
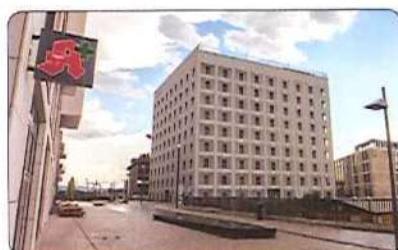
A. Cube
B. Cone
C. Cylinder
D. Sphere
E. Rectangular prism
F. Square pyramid

g. The Ministry of Foreign Affairs-Egypt

A. Cube
B. Cone
C. Cylinder
D. Sphere
E. Rectangular prism
F. Square pyramid

3. Name the solid figure. Then tell the number of faces, edges, and vertices.

a.
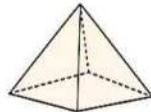
Name : _____
* _____ faces.
* _____ edges.
* _____ vertices.

b.
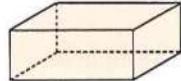
Name : _____
* _____ faces.
* _____ edges.
* _____ vertices.

c.
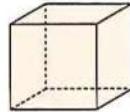
Name : _____
* _____ faces.
* _____ edges.
* _____ vertices.
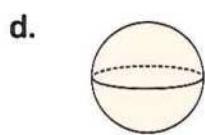
d.

Name : _____

* _____ flat faces.

* _____ edges.

* _____ vertices.

e.

Name : _____

* _____ flat faces.

* _____ edges.

* _____ vertices.

f.
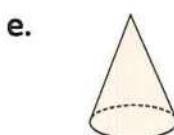
Name : _____

* _____ flat faces.

* _____ edges.

* _____ vertices.

4. 📖 **Complete to fill in the table.**

	Name	Picture	Face/Base Shape[s]	Number of Faces/Bases	Number of Edges	Number of Vertices
		Attributes of Three-Dimensional Shapes				
a.	Cube					
b.	Cone					
c.	Cylinder					
d.	Rectangular Prism [Cuboid]					
e.	Sphere					
f.	Square Pyramid					

213

5. Circle the solid figures that match the given data.

a. Shapes with 6 or more edges.
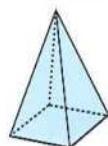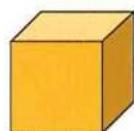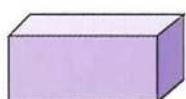
b. Shapes with 5 vertices.
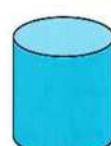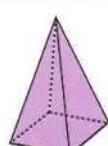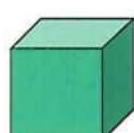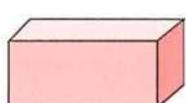
c. Shapes with at least 1 circle face.
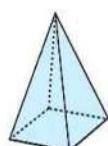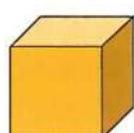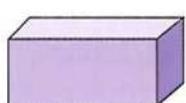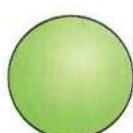
d. Shapes with more than 2 faces but fewer than 6.
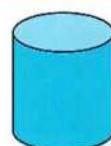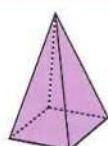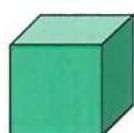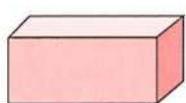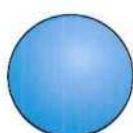
e. Shapes with 0 edges, 0 faces and 0 vertices.
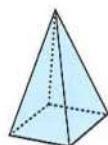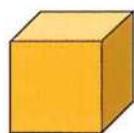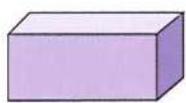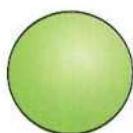
f. Shapes with more than 5 vertices.
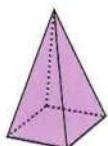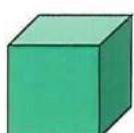
6. Who am I ?

   a. I have no edges, no flat faces and no vertices.   [———]

   b. I have 6 squared faces, 12 edges and 8 vertices.   [———]

   c. I have squared base, 5 faces, 8 edges and 5 vertices.   [———]

   d. I have 2 circular bases, no edges and no vertices.   [———]

   e. I have one circular base, one vertex and no edges.   [———]

7. Complete.

a.
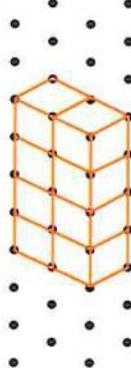
* ——— cube high.
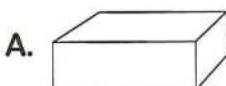* ——— cube long.
* ——— cube wide.
* Volume
  = ——— cubes.

b.
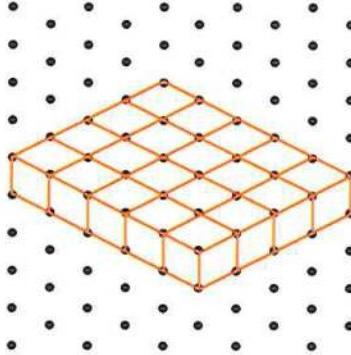
* ——— cube high.
* ——— cube long.
* ——— cube wide.
* Volume
  = ——— cubes.

c.
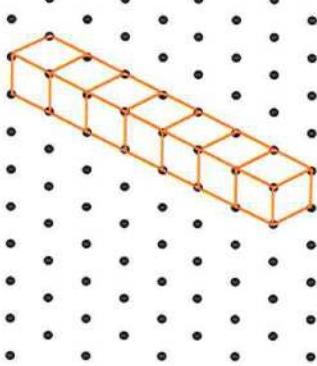
* ——— cube high.
* ——— cube long.
* ——— cube wide.
* Volume = ——— cubes.

d.

* ——— cube high.
* ——— cube long.
* ——— cube wide.
* Volume = ——— cubes.
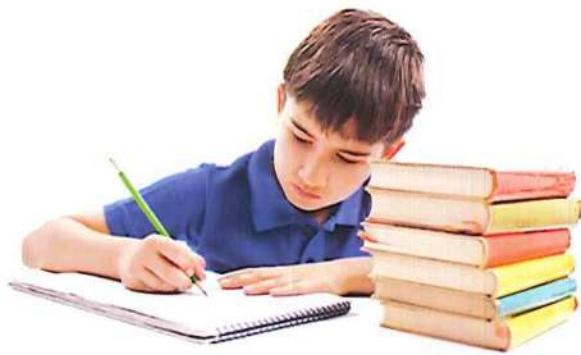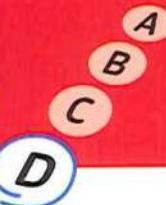
Choose the correct answer:

1. Which of the following is a cube?

A.   B.   C.   D.
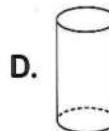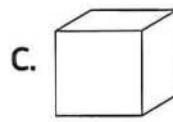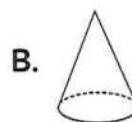
2. Which of the following has 8 vertices?

A. Sphere

C. Square-based pyramid

B. Rectangular prism

D. Cone

3. In which of the following you can find ⬜ ?

A. Cube B. Sphere C. Rectangular prism D. Cylinder

4. The solid which has 12 edges, 8 vertices and 6 rectangle faces is _____

A. cube B. cuboid C. square base pyramid D. cylinder

5. has _____

A. 4 B. 8 C. 10 D. 2

6. Volume of _____ volume of

A. > B. < C. =

7. The cuboid has _____ edges.

A. 14 B. 8 C. 20 D. 12

8. The pieces of cards △ △ △ △ ⬜ can form _____

A. cuboid B. cube C. pyramid D. cylinder

- **Estimating and Measuring Volume**
- **Same Volume, Different Shape**

Learn ① Form cube / cuboid and find its volume

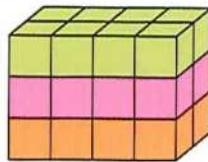Use blocks game to form solids, then count the used block pieces to find the volume.

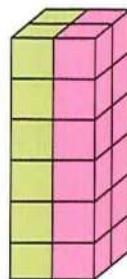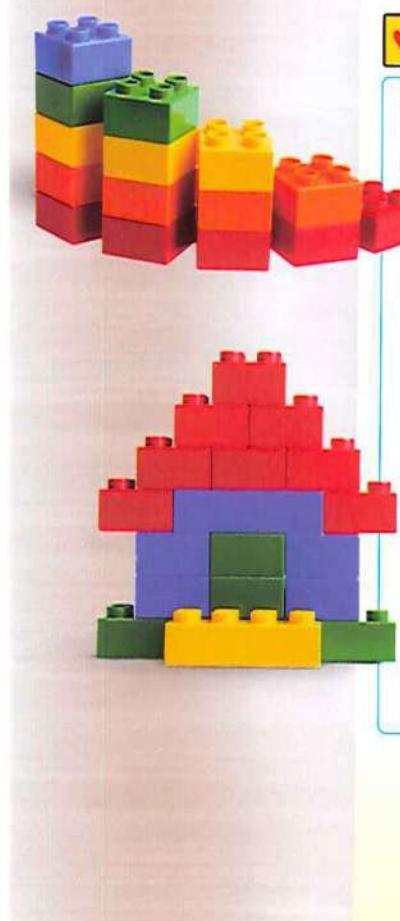|			
Number of horizontal layer	1	2	3
Number of cubes in each horizontal layer	6	6	6
Volume	$1 \times 6 = 6$ cube units	$2 \times 6 = 12$ cube units	$3 \times 6 = 18$ cube units

Check your understanding

Complete.

a.

- Number of horizontal layer = _____
- Number of cubes in each horizontal layer = _____ cubes.
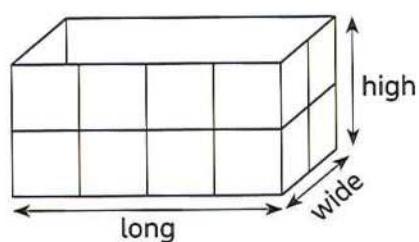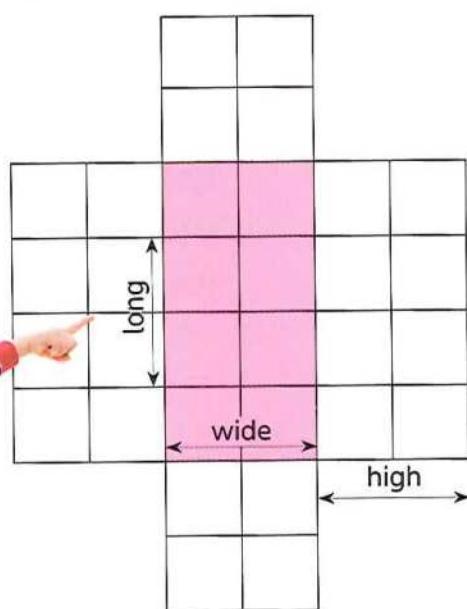- Volume = _____ × _____
    = _____ cube units

b.

- Number of vertical slices = _____
- Number of cubes in each vertical slices = _____
- Volume = _____ × _____
    = _____ cube units

Learn ② Using net square to form a cube / cuboid

If you cut the opposite net square of 1 cm unit and fold the shape so that the coloured part as the base of the formed solid, then tape the terminals together to form a cuboid whose :

- Long = 4 cm
- Wide = 2 cm
- High = 2 cm

- Number of layer = 2
- Number of cubic centimeter (cm³) in each layer = 8
- Volume = 2 × 8 = 16 cm³

✓ Check your understanding

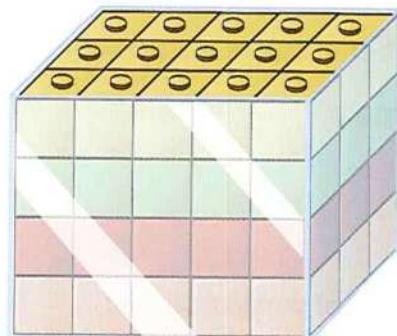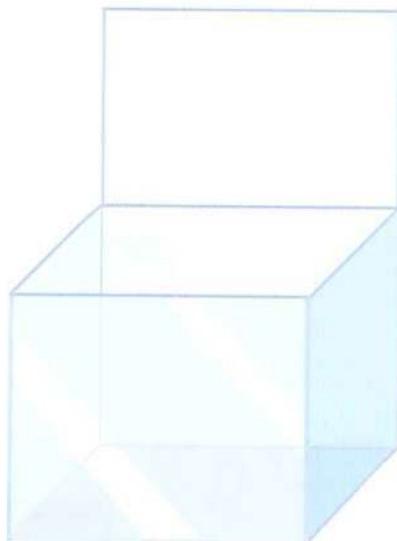If you cut and fold the opposite net square, then complete.

a. Name of the resulted solid ———

b. Volume of the resulted solid ———
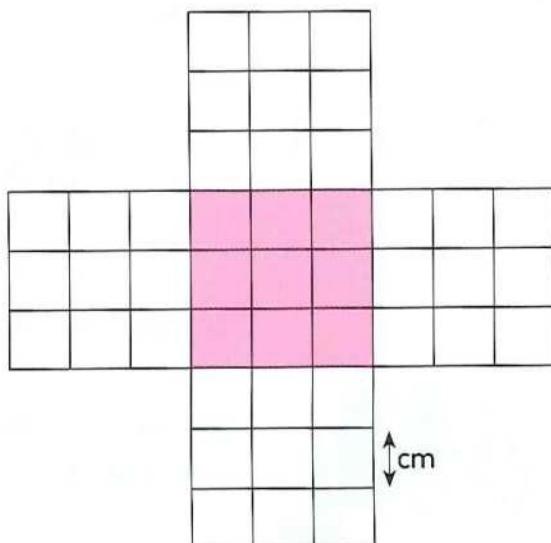
Volume / Capacity

Volume	Capacity
Is how much space a three-dimensional figure takes up.	Is the amount a three-dimensional figure can hold.

• **How could you measure the capacity of a box as a cuboid ?**

1 Fill up the inner space of the box with cube units.

2 Count number of cubes layer ⟹ 4

3 Count number of cubes in each layer ⟹ 15

4 Capacity of the box = volume of inner space
= 4 × 15 = 60 cube units

219
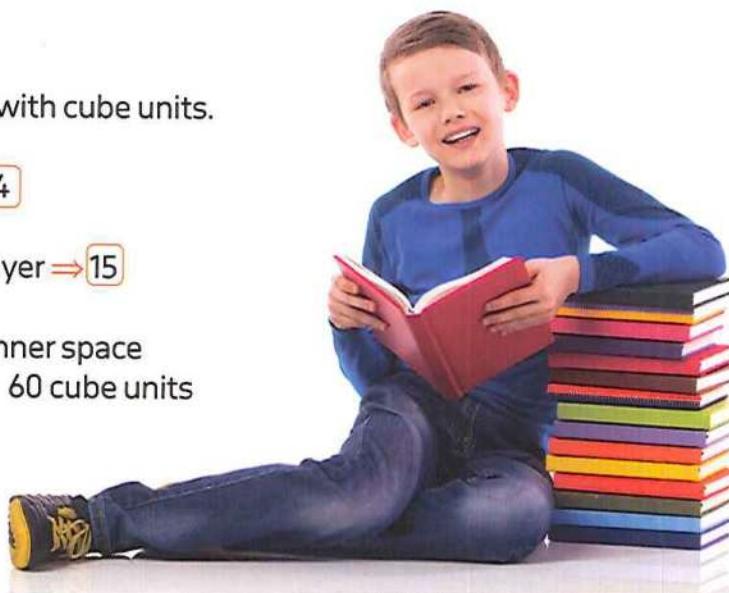
• **Estimating and Measuring Volume**

• **Same Volume, Different Shape**

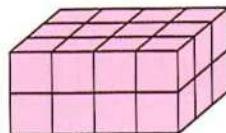● REMEMBER   ● UNDERSTAND   ○ APPLY   •• PROBLEM SOLVING | 📖 From the school book

1. Complete, where the unit cube is 1 cm³

    a. 📖 1. Number of horizontal layers : ————
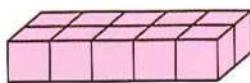
        2. Number of cubes in each horizontal layer : ————

        3. Volume = ———— × ———— = ———— cm³

    b. 1. Number of horizontal layers : ————

        2. Number of cubes in each horizontal layer : ————

        3. Volume = ———— × ———— = ———— cm³

    c. 1. Number of vertical slices : ————

        2. Number of cubes in each vertical slice : ————
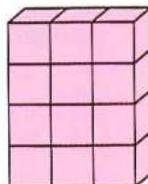
        3. Volume = ———— × ———— = ———— cm³

    d. 📖 1. Number of vertical slices : ————

        2. Number of cubes in each vertical slice : ————
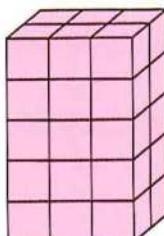
        3. Volume = ———— × ———— = ———— cm³

    e. 1. Number of horizontal layers : ————

        2. Number of cubes in each horizontal layer : ————

        3. Volume = ———— × ———— = ———— cm³
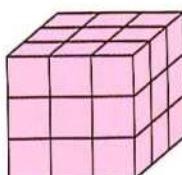
2. 📖 **Using your centimeter cubes.** Decompose the shape into layers [horizontal] or slices [vertical] in three different wayes. Then, draw your layers and slices in the given blank models.
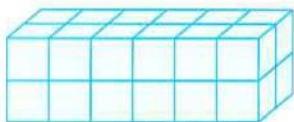
, then complete the table for the models you created.

Number of layers / slices	Cubes in each layers / slices	Volume of the prism

3. 📖 **How many cubes ?**

   a. Copy the given figure into your grid paper. [The images on the page are smaller than they will be on your grid paper].

   b. Cut out the image.

   c. Fold the shape so the shaded section is the base of the shape.

   d. Tape the shape together to form a box.

   e. Estimate the volume of the shape.

   f. Use the centimeter cubes to measure the actual volume.

   1.
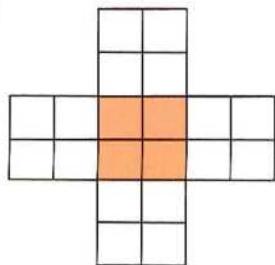
   Estimated volume : ———— cubic centimeters.

   Actual volume : ———— cubic centimeters.

2.
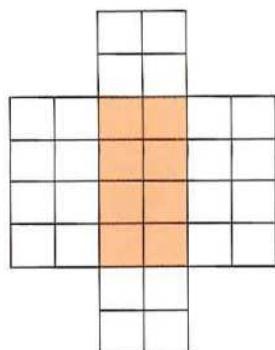
Estimated volume : —— cubic centimeters.

Actual volume : —— cubic centimeters.

3.
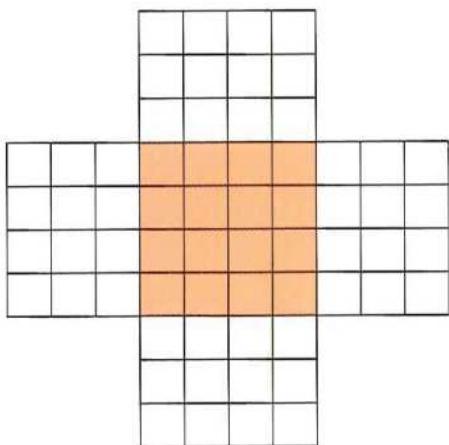
Estimated volume : —— cubic centimeters.

Actual volume : —— cubic centimeters.

4.
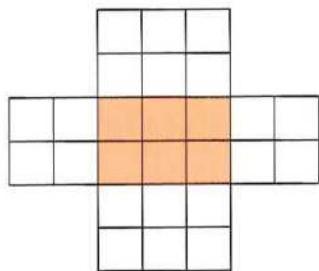
Estimated volume : —— cubic centimeters.

Actual volume : —— cubic centimeters.

5.
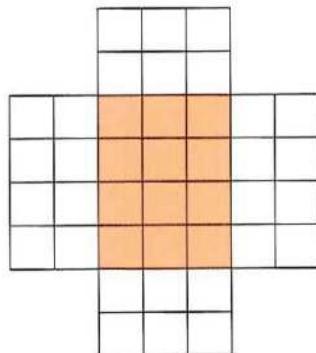
Estimated volume : —— cubic centimeters.

Actual volume : —— cubic centimeters.

4. Match each net square to its suitable solid.

a.
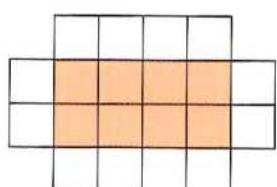
b.
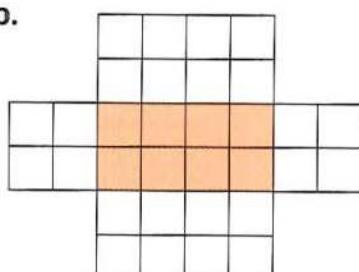
c.
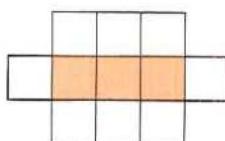
1

2

3
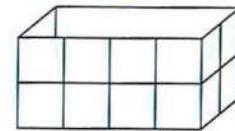
5. 📖 **Painting the cube.** Imagine you put blue paint on every side of the cube shown, including the base. **Answer the questions.**
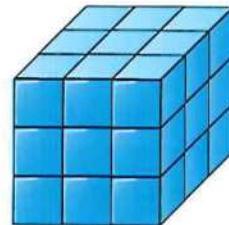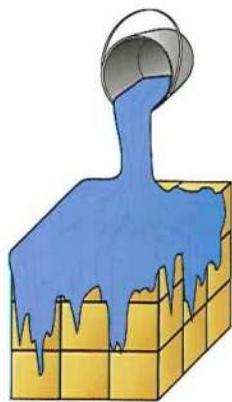
a. How many of the small cubes have 3 blue faces?

b. How many have 2 blue faces?

c. How many have 1 blue face?

d. How many have not been painted at all?

6. Find capacity.

a.

b.
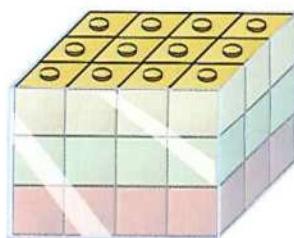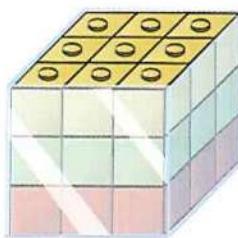
Choose the correct answer.
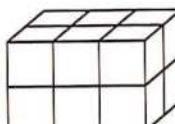
1. Volume of is _____ cube units

    A. 8   **B.** 12   **C.** 24   **D.** 10

---

2. Which of the following is of volume 8 cm^3 ?
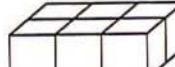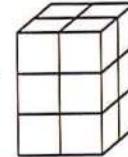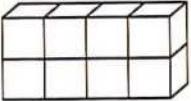
    A.   **B.**   **C.**   **D.**

---
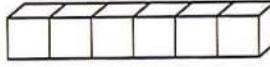
3. Which of the following has different volume ?
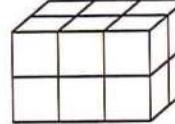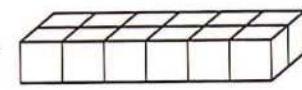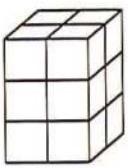
    A.   **B.**   **C.**   **D.**

---
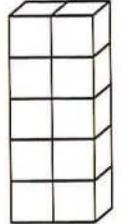
4. A cuboid has 3 horizontal layers and 6 cube units in each layer, then its volume = _____ cube units.

    A. 9   **B.** 18   **C.** 24   **D.** 12

---

5. A cuboid has 2 vertical slices each slice has 4 cm^3, then its volume = _____ cm^3

    A. 6   **B.** 4   **C.** 12   **D.** 8

---

6. A box is filled by 4 horizontal layer, each layer containes 8 cube units, then its capacity = _____ cube unit.

   **A.** 4   **B.** 12   **C.** 32   **D.** 24

---

7. What solid is formed from folding the net square ?
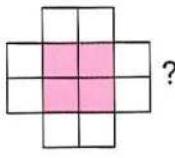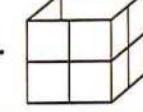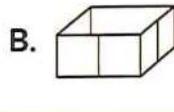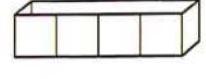
    A.   **B.**   **C.**   **D.**

---

8. What is the volume of the solid formed from folding the net square ?
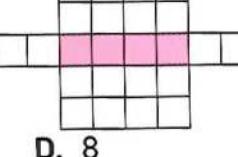
    A. 12   **B.** 4   **C.** 16   **D.** 8

Concept 2

Measuring Volume

Lesson No.	Lesson Name	Lesson Objectives
Lessons 5 to 7	Finding a Formula	• Students will identify a formula for calculating the volume of right rectangular prisms. • Students will apply a formula to calculate the volume of right rectangular prisms.
	Using a Formula to Find Volume	• Students will apply a formula to calculate the volume of right rectangular prisms.
	Finding the Volume of Compound Shapes	• Students will find the total volume of two or more right rectangular prisms.
Lessons 8 & 9	Solving Real-World Volume Story Problems	• Students will solve real-world story problems involving volume.
	Building Three-Dimensional Cities	• Students will design a city using three-dimensional shapes and a set of criteria.

- **Finding a Formula**
- **Using a Formula to Find Volume**
- **Finding the Volume of Compound Shapes**

Learn 1 Volume of rectangular prism (cuboid)

- **Volume** = length × width × height
- **Volume** = base area × height

For Example :

Find volume of the rectangular prism

4 cm "length"
2 cm "height"
3 cm "width"
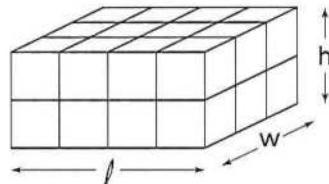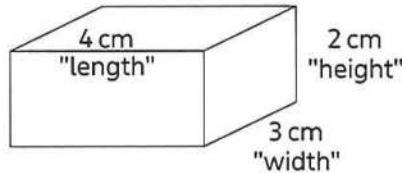
$l = 4$ cm, $w = 3$ cm, $h = 2$ cm

Volume
- Number of horizontal layers = 2
- Number of cubes in each layer = 12
- Volume = 2 × 12
  = 24 cm^3

Volume
- Length = 4 cm, width = 3 cm and height = 2cm
- Length × Width × Height
  = 4 × 3 × 2 = 24 cm^3
- Volume = 24 cm^3

Volume
- Base Area
  = length × width
  = 4 × 3 = 12 cm^2
- Base Area × Height
  = 12 × 2 = 24 cm^3
- Volume = 24 cm^3

v
l | w | h
$v = l \times w \times h$
$l = \dfrac{v}{w \times h}$
$w = \dfrac{v}{l \times h}$
$h = \dfrac{v}{l \times w}$

v
$b.a$ | h
$v = $ base area × h
base area $= \dfrac{v}{h}$
$h = \dfrac{v}{\text{base area}}$

Example 1

Find volume of each of the following.

a.

b.

10 cm

8 cm

20 cm

c.

Area = 25 cm²

20 cm
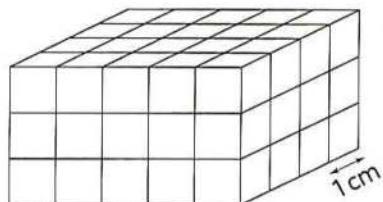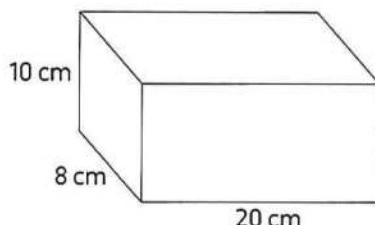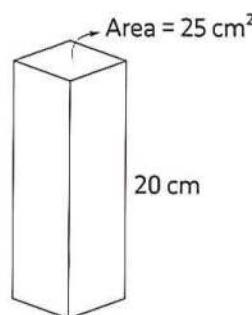
Solution 💡

a. Volume = $l \times w \times h = 5 \times 4 \times 3 = 60$ cm³

b. Volume = $l \times w \times h = 20 \times 8 \times 10 = 1,600$ cm³

c. Volume = base area $\times h = 25 \times 20 = 500$ cm³

Example 2

Find the missing dimension in each of the following where the volume is known.

a.

20 cm

10 cm

?

Volume = 1,000 cm³

b.

15 cm

4 cm

?

Volume = 600 cm³

c.

Area = 12 cm²

?
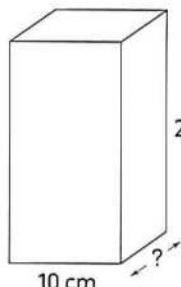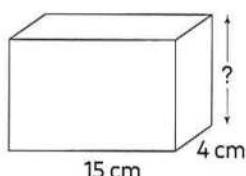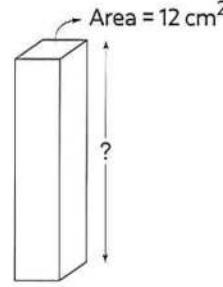
Volume = 240 cm³

Solution 💡

a. $w = \dfrac{v}{l \times h} = \dfrac{1,000}{10 \times 20} = \dfrac{1,000}{200} = 5$ cm

b. $h = \dfrac{v}{l \times w} = \dfrac{600}{15 \times 4} = \dfrac{600}{60} = 10$ cm

c. $h = \dfrac{v}{\text{base area}} = \dfrac{240}{12} = 20$ cm

✓ Check your understanding

Find volume of each of the following.

a.

b.

Area = 36 cm²

10 cm

c.

20 cm

30 cm

8 cm
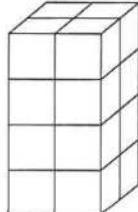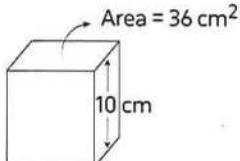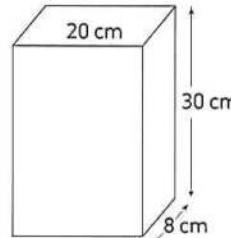
Learn ② Finding the volume of compound shapes

Volume 1

$= 40 \times 30 \times 20$

$= 24,000 \text{ cm}^3$

Volume 2

$= 60 \times 30 \times 40$

$= 72,000 \text{ cm}^3$

Volume 3

$= 24000 + 72000$

$= 96,000 \text{ cm}^3$
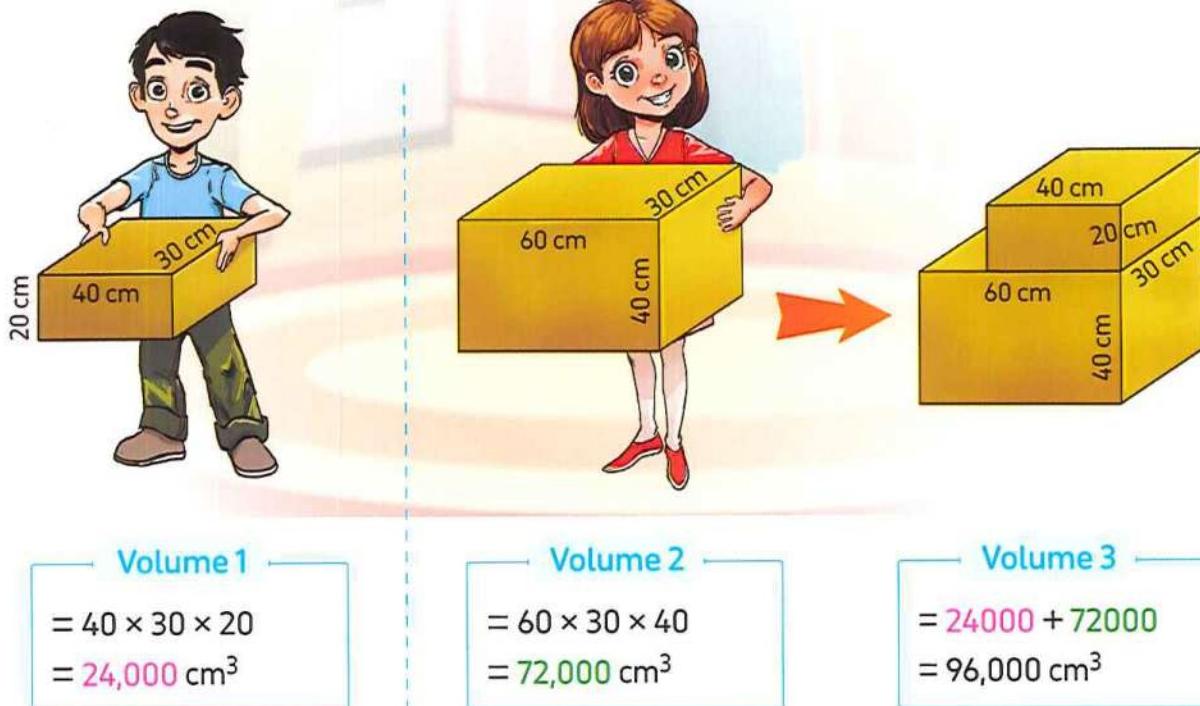
Example 3

In each of the following solids, answer the following questions.

a. What is the volume of the larger cuboid on the bottom of the compound shape ?

b. What is the volume of the smaller cuboid on the top of the compound ?

c. What is the total volume of the compound shape ?

First compound shape

5 cm

6 cm

8 cm

20 cm

2 cm

Second compound shape

10 cm

4 cm

5 cm

4 cm

6 cm
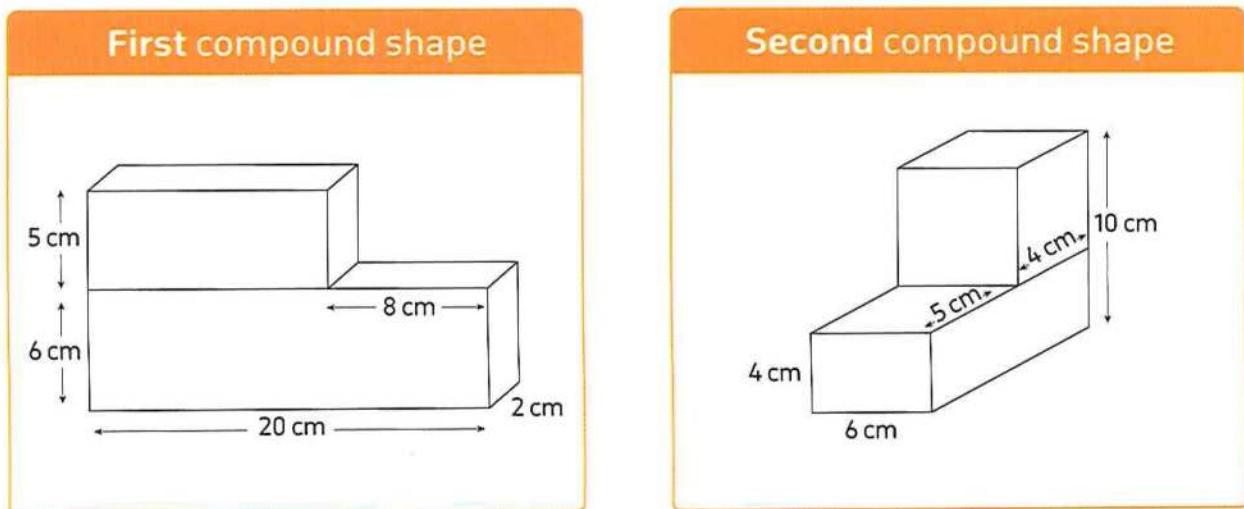
Solution

First compound shape :

a. Volume of larger cuboid = $20 \times 2 \times 6 = 240$ cm^3

b. Volume of smaller cuboid = $12 \times 2 \times 5 = 120$ cm^3

c. Volume of compound shape = $240 + 120 = 360$ cm^3

Second compound shape :

a. Volume of larger cuboid = $6 \times 9 \times 4 = 216$ cm^3

b. Volume of smaller cuboid = $6 \times 4 \times 6 = 144$ cm^3

c. Volume of compound shape = $216 + 144 = 360$ cm^3

✓ Check your understanding

Find volume of each of the following compound shapes.

a.
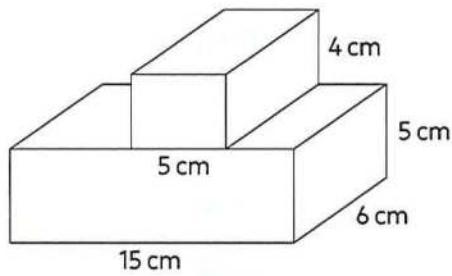
b.
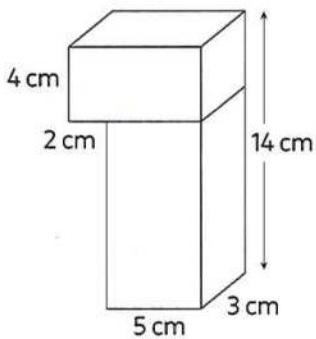
- **Finding a Formula**
- **Using a Formula to Find Volume**
- **Finding the Volume of Compound Shapes**

● REMEMBER   ● UNDERSTAND   ● APPLY   ●● PROBLEM SOLVING   📖 From the school book

1. Complete, where the length unit is 1 cm.

a. 📖
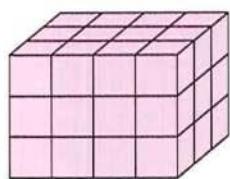
Length : ——— cm

Width : ——— cm

Height : ——— cm

Volume : ——— cm³

b. 📖
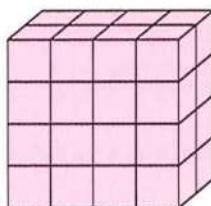
Length : ——— cm

Width : ——— cm

Height : ——— cm

Volume : ——— cm³

c.
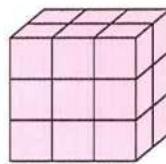
Length : ——— cm

Width : ——— cm

Height : ——— cm

Volume : ——— cm³

d.

Length : ——— cm

Width : ——— cm

Height : ——— cm

Volume : ——— cm³

e. 📖
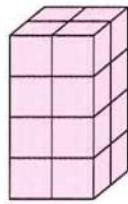
Length : ——— cm

Width : ——— cm

Height : ——— cm

Volume : ——— cm³

f. 📖
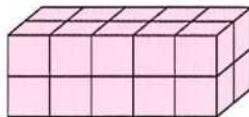
Length : ——— cm

Width : ——— cm

Height : ——— cm

Volume : ——— cm³

g.
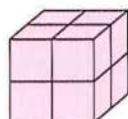
Length : ——— cm

Width : ——— cm

Height : ——— cm

Volume : ——— cm³

h.
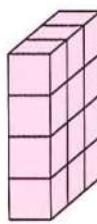
Length : ——— cm

Width : ——— cm

Height : ——— cm

Volume : ——— cm³

2. Find the volume of each of the following.
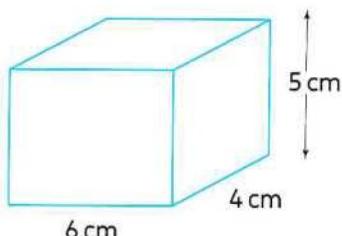
a.

5 cm
4 cm
6 cm

Volume = —— cm³

b.

4 cm
3 cm
10 cm

Volume = —— cm³

c.

3 cm   3 cm
10 cm

Volume = —— cm³

d.

4 m
4 m
4 m

Volume = —— m³

e.

Area = 12 cm²
10 cm

Volume = —— cm³

f.

Area = 36 m²
5 m

Volume = —— m³

g.

Area = 24 m²
5 m
10 m

Volume = —— m³

h.

3 cm
3 cm
12 cm
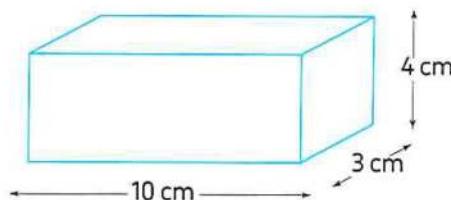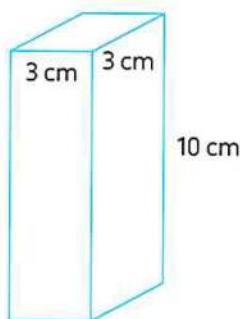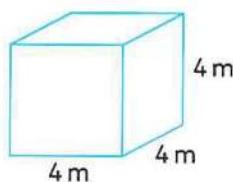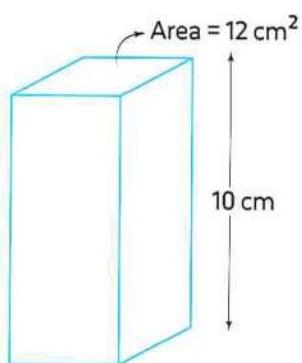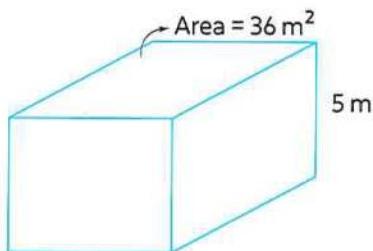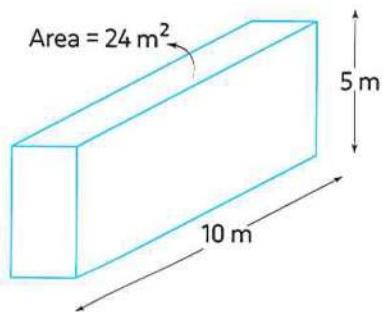
Volume = —— cm³

3. 📖 Compare the dimensions of the rectangular prism. Which two prisms have the same volume ? Explain how you know.

A.

4 m
6 m
3 m

B.

8 m
6 m
2 m

C.

2 m
12 m
3 m

4. Complete.

a.

?
5 cm
6 cm
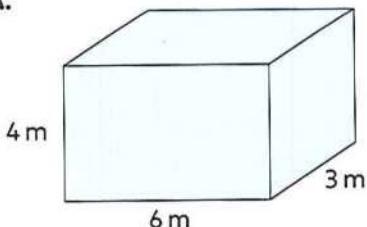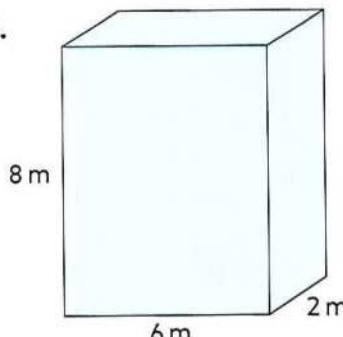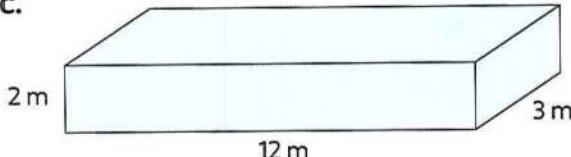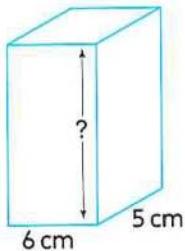
• Volume = 300 cm³
• Missing dimension = ———— cm

b.

10 cm
20 cm
?
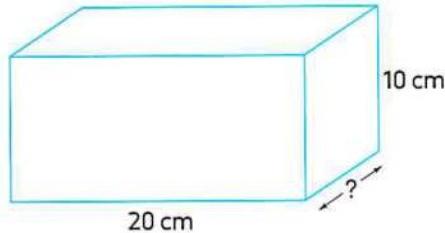
• Volume = 1,200 cm³
• Missing dimension = ———— cm

c.

5 cm
5 cm
?
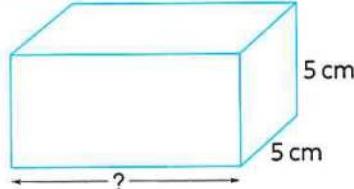
• Volume = 250 cm³
• Missing dimension = ———— cm

d.

?
3 cm
3 cm
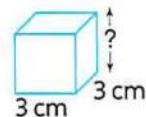
• Volume = 27 cm³
• Missing dimension = ———— cm

e.

Area = 12 m²
?
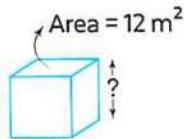
• Volume = 48 cm³
• Missing dimension = ———— cm

f.

8 cm
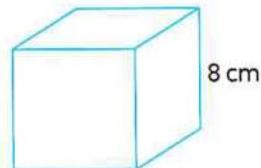
• Volume = 320 cm³
• Base area = ———— cm²

232

5. Complete.

a. A rectangular prism of length 7 cm, width 5 cm and height 2 cm, then its volume = —————— cm^3

b. A cuboid whose base area 15 cm^2 and height 10 cm, then its volume = —————— cm^3

c. A cuboid whose volume 300 cm^3 and base area 30 cm^2, then its height = —————— cm

d. A cuboid whose volume 36 cm^3, length 4 cm and width 3 cm, then its height = —————— cm

e. A cuboid whose volume 24 cm^3 and its height 3 cm, then its base area = —————— cm^2

f. A cuboid whose volume 40 cm^3 and its height 4 cm, its width 2 cm, then its length = —————— cm

6. 📖 Use the given solid figure to answer questions.
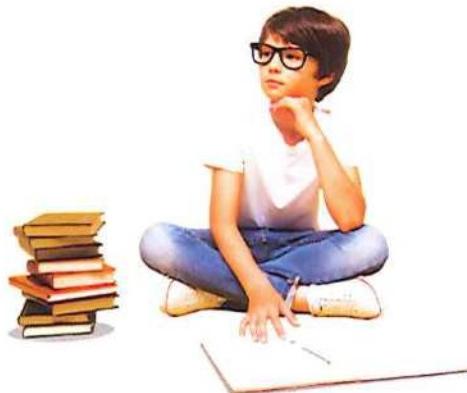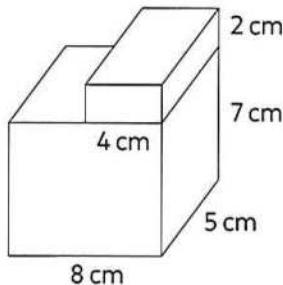
a. What is the volume of the larger prism on the bottom of the compound shape ? ——————

b. What is the volume of the smaller prism on the top of the compound shape ? ——————

c. What is the total volume of the compound shape ? ——————

7. What is the volume of the given compound shape ?

a. 📖

b. 📖

_____

_____

c.

10 cm   4 cm   6 cm   5 cm

d.

10 cm   6 cm   5 cm   8 cm   4 cm

e. 📖

6 cm   4 cm   2 cm   10 cm   3 cm

f.

2 cm   2 cm   12 cm   10 cm   4 cm

g.

12 cm   2 cm   5 cm   8 cm   5 cm   2 cm

h.

15 m   5 m   20 m   4 m   4 m
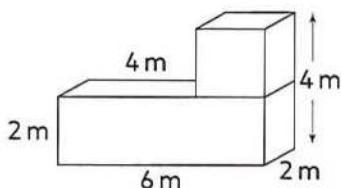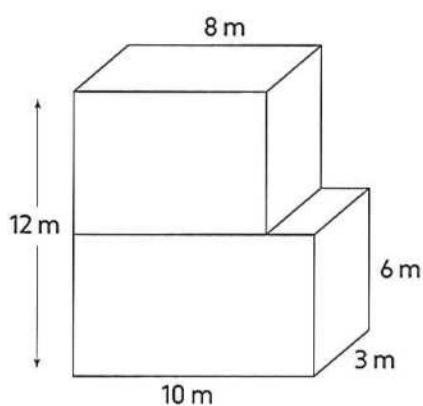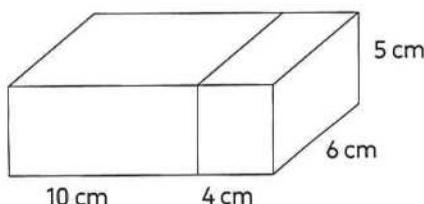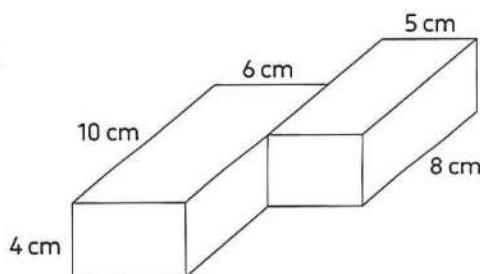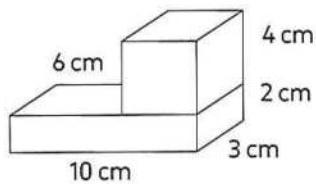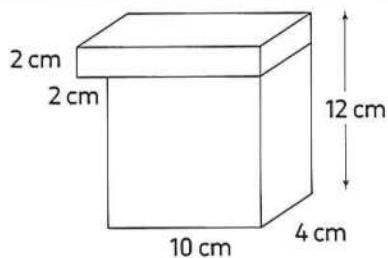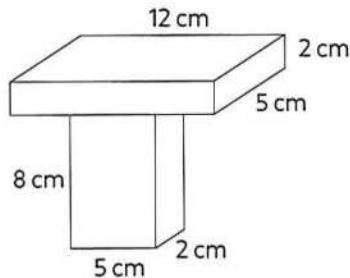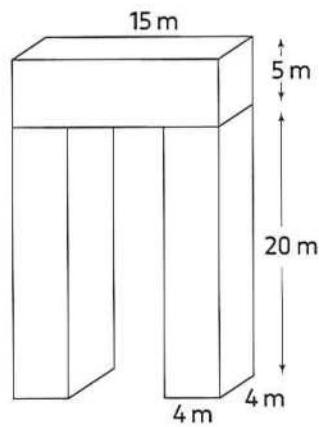
8. 📖 **Abdallah and Doha each have Senet game board. Abdallah says that the volume of both boards is the same because they both have 30 squares on top.**

30 cm   6 cm   8 cm
Abdallah's game
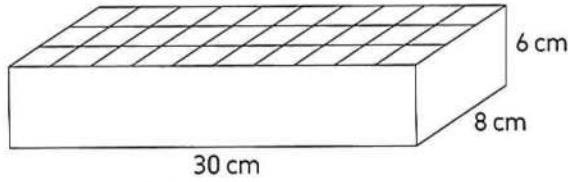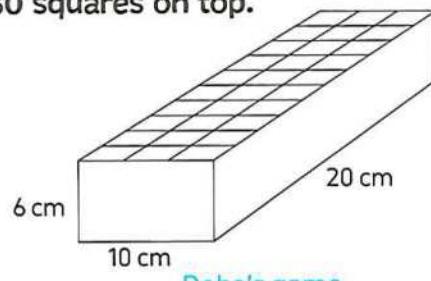
6 cm   10 cm   20 cm
Doha's game

Do you agree or disagree based on what you have learned about volume and cubic units ? Explain your reasoning.

9. 📖 **Which Box Will Work ?** Hanaa wants to send a jewelry box to her sister. The jewelry box has a volume of 16,000 cm³. **Which box can Hanaa use to send the jewelry box ? Explain how you know.**

A.

10 cm
40 cm
10 cm

B.

60 cm
10 cm
10 cm

C.

60 cm
20 cm
20 cm

D.

20 cm
15 cm
50 cm
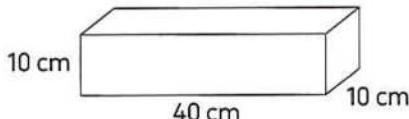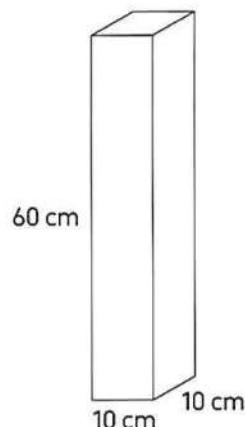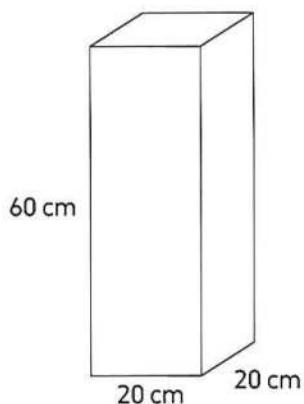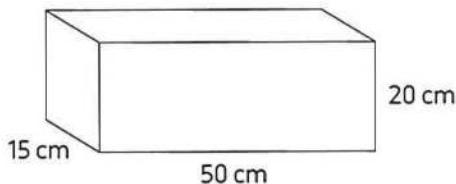
10. 📖 **Eman says that prism B has the greatest volume because it has the greatest height. Do you agree or disagree ? Explain your thinking.**

A.

12 cm
3 cm
3 cm

B.

6 cm
12 cm
3 cm

C.

3 cm
6 cm
12 cm
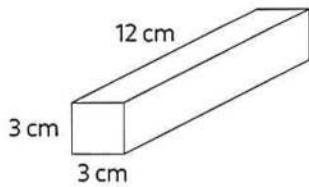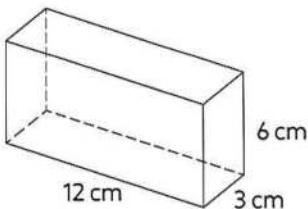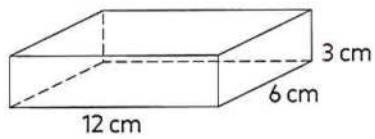
11. 📖 a. What is the volume of a rectangular prism with dimensions 3 cm × 2 cm × 2 cm ?

   b. What is the volume of a rectangular prism that measures 2 centimeters on each side ?

   c. What is the total volume when the prisms in the previous two questions are combined ?

12. 📖 **a.** What is the volume of the rectangular prism shown ? Be sure to use units in your answer.

4 m

2 m

5 m
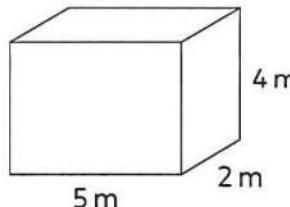
b. What would be the total volume of the prism in the previous question if you stacked two of these cubes one on top of the other ?

13. 📖 Radwa says that more information is needed to find the volume of the prism. Do you agree or disagree ?

Area = 20 cm^2

12 cm
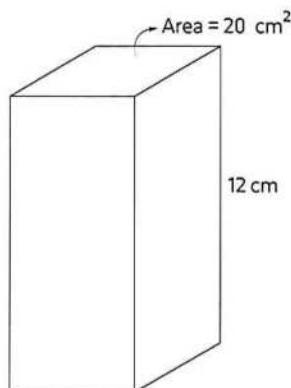
14. 📖 The volume of the rectangular prism is 630 m^3. How you could find the missing dimension?

15 m

?

6 m
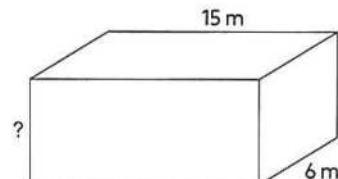
15. 📖 The volume of the rectangular prism shown is 400 cubic centimeters. Adham says the missing dimension is 350 cm. Amira says the missing dimension is 8 cm. Which student is correct and why ?

5 cm

10 cm
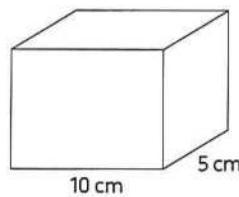
Choose the correct answer.

1. The volume of the opposite solid = ——— cm³

A. 17

B. 170

C. 120

D. 140

3 cm / 4 cm / 10 cm

2. Which of the following has the greatest volume?

A. 3 cm, 4 cm, 5 cm

B. 6 cm, 3 cm, 2 cm

C. 5 cm, 1 cm, 10 cm

D. 1 cm, 2 cm, 12 cm
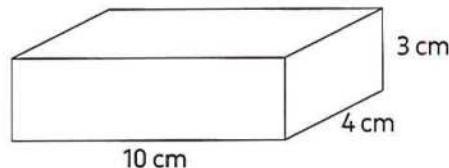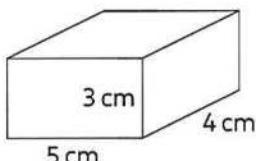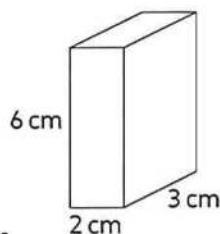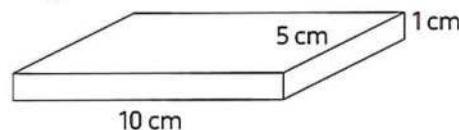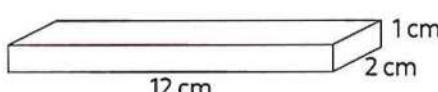
3. Which of the following has the smallest volume?

A. 2 cm, 2 cm, 2 cm, 3 cm, 4 cm

B. Area = 8 cm², 6 cm

C. 5 cm, 2 cm, 5 cm

D. 10 cm, 1 cm, 3 cm
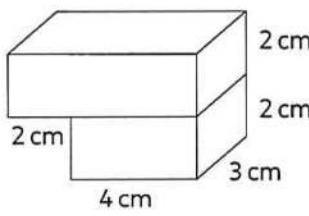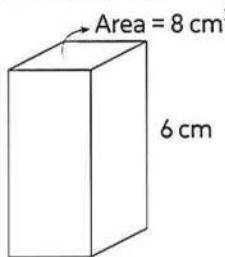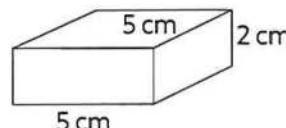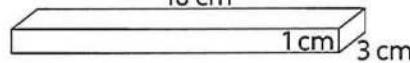
4. The volume of the compound shape = ——— cm³

A. 180

B. 130

C. 160

D. 120

Area = 10 cm², 3 cm, 5 cm, 10 cm, 3 cm
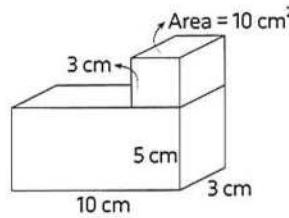
5. Volume of cuboid = 60 cm³ and base area = 20 cm², then its height = ——— cm

A. 1200

B. 80

C. 3

D. 40

6. Which of the following is incorrect?

A. $v = L \times w \times h$

B. $v = \text{base area} \times h$

C. $l = \dfrac{\text{base area}}{v}$

D. $w = \dfrac{v}{l \times h}$

237

7. 📖 Look at Abdallah's Senet board.

6 cm

8 cm

30 cm
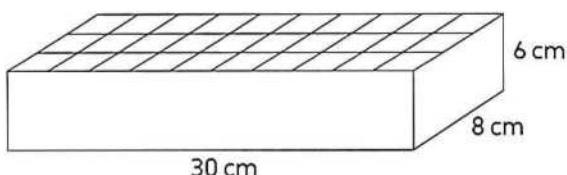
Abdallah's game

Which equation could be used to find the volume , V ?

A. $[30 + 8] \times 6 = V$ **B.** $[6 + 8] + 30 = V$ **C.** $[30 \times 8] \times 6 = V$ **D.** $[6 \times 8] + 30 = V$

---

8. 📖 Consider the dimensions of the rectangular prism. Which of the following expressions would give the volume of the rectangular prism ?
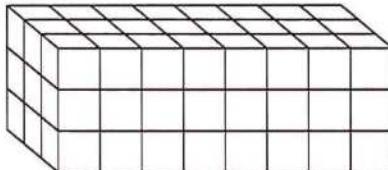
A. $11 + 3$ because the area of the prism's base is $8 + 3 = 11$ square units, and the height is 3 length units.

B. 11×3 because the area of the prism's base is $8 + 3 = 11$ square units, and the height is 3 length units.

C. $24 + 3$ because the area of the prism's base is $8 \times 3 = 24$ square units, and the height is 3 length units.

D. 24×3 because the area of the prism's base is $8 \times 3 = 24$ square units, and the height is 3 length units.

- ## Solving Real-World Volume Story Problems
- ## Building Three-Dimensional Cities

Learn

Sara brought an aquarium fish tank of internal dimensions, length 80 cm, width 30 cm and height 50 cm, then she poured water in it up to the 40 cm height line.
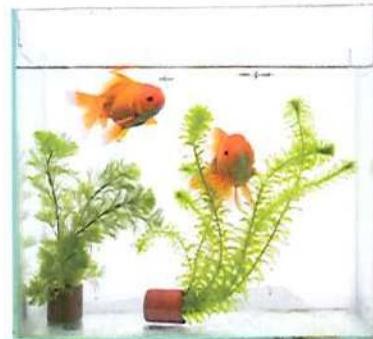
Problem

1 What is the inner volume of the aquarium fish tank?

2 What is the volume of poured water?

Solution

Think about the suitable, formula
$V = l \times w \times h$

1 **For the aquarium tank:**

Length = 80 cm, width = 30 cm and height = 50 cm

Volume = $l \times w \times h$ = 80 × 30 × 50 = 120,000 cm^3

2 **For the poured water:**

Poured water take the shape of cuboid of

length = 80 cm, width 30 cm and height 40 cm

Volume = $l \times w \times h$ = 80 × 30 × 40 = 96,000 cm^3

Example

Samy wants to design a box of volume 60,000 cm^3 to fit an area of length 50 cm and width 40 cm
What is the height of the box?

Solution

$h = \dfrac{v}{l \times w} = \dfrac{60,000}{50 \times 40} = \dfrac{60,000}{2,000} = 30$ cm

Height of the box = 30 cm
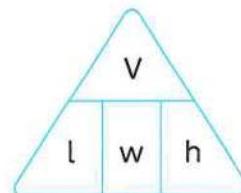
Activity Building Your Own City

- On your large sheet of paper, draw a map of your city first. Your map should include.

   1. At least 2 parallel roads.   2. At least 1 road that is perpendicular to another.

   Then, add your building to the map.

- Trace, fold, stick, put on the map and create your own city.

- Label all three-dimensional figures on your map.
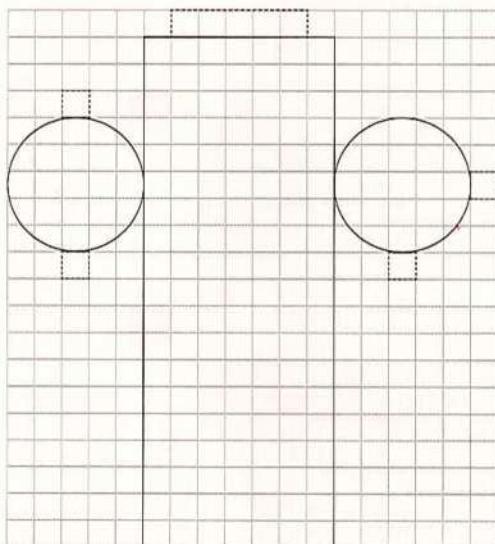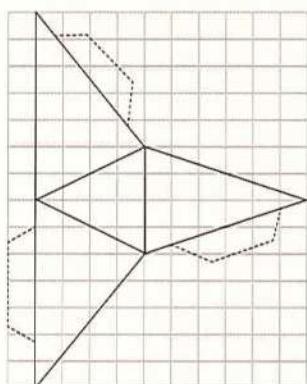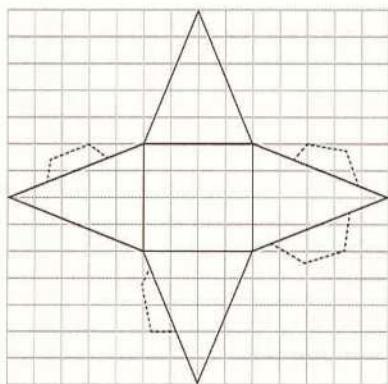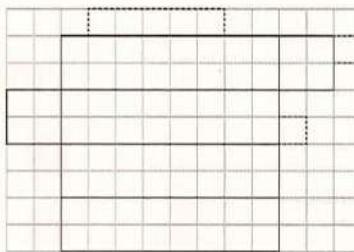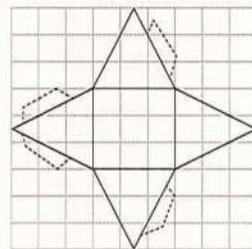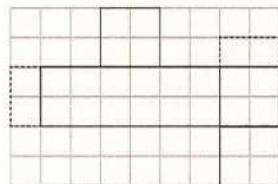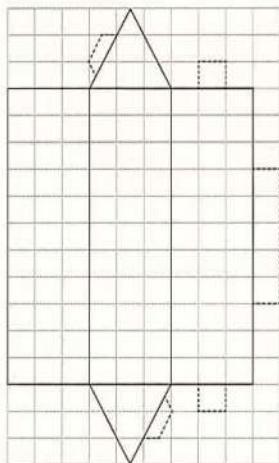
✓ **Check** your understanding

8,100 cm³ of water are poured in a cuboid-shaped vessel with a square base of side length 25 cm. **Find the height of water in the vessel.**

_____

_____

_____

1. 📖 The oldest canopic chest ever found was that of Hetepherese, mother of king Khufu.

   The chest measures about 54 centimeters long, 49 cm wide, and 35 cm tall.

   What is the volume of the chest ?

---

2. A juice case is in the shape of cuboid, its base is square-shaped of side length 6 cm

   and its height is 15 cm

   Calculate the volume of juice which fills the case completely.

---

3. A swimming pool is in the shape of a cuboid, its base is of length 60 meters and its width

   is 40 meters. **Find its depth if 36,000 cm^3 of water fill this swimming pool completely.**

---

4. 📖 Osman built a planter box for his backyard. The length of the planter box was

   150 centimeters. The width was 90 cm, and the height of the box was 120 cm. Osman

   poured soil into the box up to the 100 cm height line. **What is the volume of the planter box ?**

   What is the volume of the soil ?

---

5. 15,750 cm^3 of water is poured into a vessel

   in the shape of a cuboid with internal

   dimensions 35 cm, 30 cm and 20 cm

   Find.

   a. **The height of water in the vessel.**

   b. **The volume of water needed to be added for the vessel to be filled with water**

   completely.

---
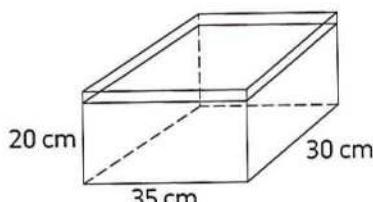
6. A container of volume 45,000 cm^3 is full of oil. Oil was poured into a cuboid-shaped

   container with a square base of side length 30 cm.

   Find the height of oil in the second container.

7. 📖 Fares built a small planter box for his window. He planned to fill it to the top with 12,000 cubic centimeters of soil. The base of the planter box measured 40 cm long and 15 cm wide. **What should the height of the box be to hold all the soil ?**

8. A cuboid-shaped container with dimensions 70 cm, 50 cm and 40 cm is full of water. Water was poured into another container. If the height of water in the last container is 100 cm. **Find the area of its base.**

9. A builder used 100 bricks for building up a wall. If each brick is in the shape of a cuboid of dimensions 25 , 12 and 6 centimeters. **Calculate the volume of the wall.**

10. A cuboid-shaped swimming pool has a base of dimensions 60 m and 30 m and its height is 3 m Water was poured into the pool till its level reached 1 m from the brim of the pool.
Find the volume of water in m³

11. A swimming pool with internal dimensions 30 , 15 and 2 meters. 450 meters cube of water are poured into it.
Find :
a. **The height of water in the swimming pool.**
b. **The volume of water which is needed to fill the swimming pool completely.**

12. 📖 **Sketch and label models. Then, write equations to solve the problems. Include units in your answers.**
   a. Nahla also decided to build planter boxes. She wanted two boxes with different dimensions, but the same volume of 20,000 cubic centimeters.
   1. **Show two ways she could build these planters.**
   2. **Record equations to match each prism.**

b. Mouataz built a model of a sarcophagus from cardboard. The model was 30 centimeters long, 10 cm wide and 8 cm tall. Is it possible for Mouataz to fit a rectangular canopic chest with an interior volume of 3,000 cm^3 inside ?
Support your thinking with a drawing and an equation.

c. Rami wanted to build a new shed. He had a spot outside his house that had an area of 4 meters long by 3 m wide. He needed the new shed to have a volume of 72 m^3.
How tall will the shed need to be ? How do you know ?
Support your thinking with a drawing and an equation.

d. Amany built a tower using centimeter cubes. The area of the base of her tower is 16 square centimeters. The tower is 15 cm tall.

   1. **What could her tower look like ? Draw and label a model.**
   2. **How many centimeter cubes did Amany use ? Record an equation.**

💡 Challenge

13. A carton box is with internal dimensions 50 , 40 and 30 cm. It is wanted to fill it with boxes of tea in the shape of cuboids, the dimensions of each box are 10 cm, 5 cm and 6 cm

Calculate the greatest number of tea boxes can be put in that box.
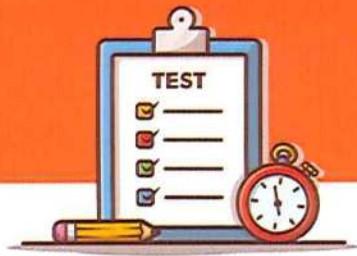
1. Choose the correct answer.

a. Which of the following has the same number of vertices as the sphere ?

   A. Cube   **B.** Cone   **C.** Pyramid   **D.** Cylinder

b. Number of edges of cube + number of edges of cone = ————

   A. 12   **B.** 13   **C.** 24   **D.** 14

c. Number of horizontal layers of is ————

   A. 4   **B.** 2

   C. 3   **D.** 24
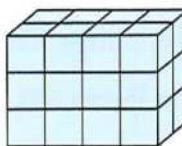
d. Cuboid of length 5 m, width 2 m and heigh 3 m, then its volume = ————

   A. 30 cm^3 **B.** 10 cm^3 **C.** 12 cm^3 **D.** 30 m^3

e. Length of the missing dimension in the opposite figure its volume 48 cm^3 is ———— cm.
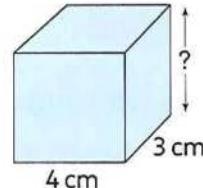
   A. 2   **B.** 3

   C. 4   **D.** 5

f. Capacity of water can be poured in a cuboid vessel of inner dimentions 30 cm, 20 cm and 10 cm equals ———— cm^3

   A. 60   **B.** 6,000   **C.** 5,000   **D.** 4,000

g. Volume of equals ————

   A. $(3+3) \times 2$ **B.** $(3+2) \times 3$ **C.** $3 \times 2 \times 3$ **D.** $3+2+3$

2. Complete.

a. Volume of the opposite compound shape is ————
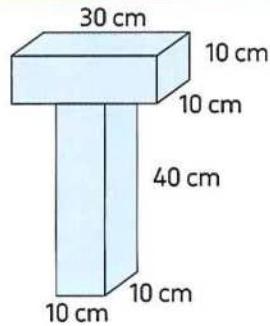
b. Number of cube units of is ————

c. The 3 dimensions shape of one vertex is ————

d. Rectangular prism has 2 horizontal layer and each layer has 6 cube units, then its volume = —————— cube units.

e. Cuboid of base area 16 cm^2 and heigh 3 cm , then its volume = —————— cm^3

f. Volume of cuboid is 40 cm^3, its length 5 cm and width 4 cm, then its height = —————— cm

g. Cylinder has —————— edges.

h. Volume of cuboid = —————— × heigh

3. Choose the correct answer.
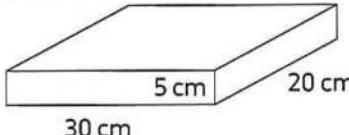
a. The volume of [figure: 5 cm, 20 cm, 30 cm] is —————— cm^3

    A. 3,000   B. 300   C. 30   D. 30,000

b. The cone has —————— vertex.

    A. 0   B. 3   C. 2   D. 1

c. The —————— has no vertices, no edges and no faces.

    A. cylinder   B. sphere   C. cube   D. cuboid

d. The missing dimension of [figure: 10 cm^3, 2 cm, 1 cm] is ——————
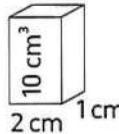
    A. 5 cm   B. 5 cm^3 C. 2 cm^3 D. 8 cm

e. Number of horizontal layers in [figure] is —————— layers.

    A. 4   B. 3   C. 2   D. 1

f. If number of vertical layers in a cuboid is 4 layers and each layer has 10 cube units, then its volume = —————— cube units.

    A. 10 + 4   B. 10 − 4   C. 10 ÷ 4   D. 10 × 4

g. Number of faces of cube ◯ Number of faces of cuboid.

    A. >   B. <   C. =

4. Answer the following.

a. Which is greater in volume? A cuboid of length 50 cm, width 40 cm and height 30 cm or a rectangular prism whose base area 3,000 cm^2 and height 15 cm.

b. Ramy used 15 cubes to build a 3 dimensions shape if volume of each cube is 27 cm^3, then find the volume of compound shape.

c. Find the volume of obtained solid by folding the opposite shape.

d. Find the volume of the opposite figure. [figure: 10 cm, 5 cm, 2 cm]

245
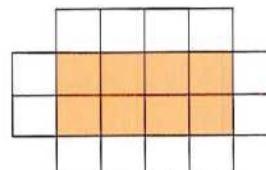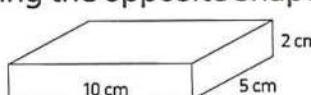
UNIT 12 | Pie Charts

» Concept 1 : Pie Charts

Pie Charts

WATER 0.7

LAND 0.3

Water and land on Earth's surface

Land

$\frac{3}{10}$

$\frac{7}{10}$

Water
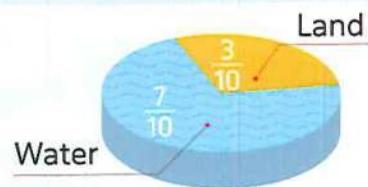
Lesson No.	Lesson Name	Lesson Objectives
Lessons 1 to 3	Introduction to Pie Charts	• Students will define the elements of a pie chart. • Students will identify connections between pie charts, fractions, and degrees of a circle.
	Understanding Pie Charts	• Students will interpret data in a pie chart.
	Making Pie Charts	• Students will shade a pie chart to display a set of data. • Students will ask and answer questions about data in a pie chart.

- **Introduction to Pie Charts**
- **Understanding Pie Charts**
- **Making Pie Charts**

Learn

- You have studied before how to represent data by line plot, bar graph, line graph or double bar graph.
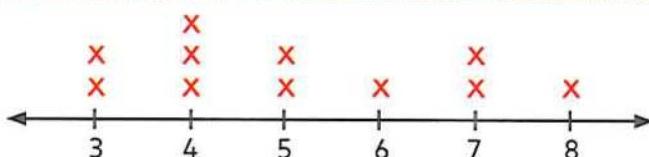
Line plot
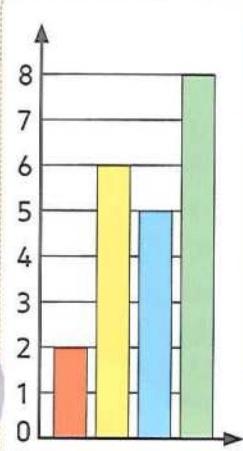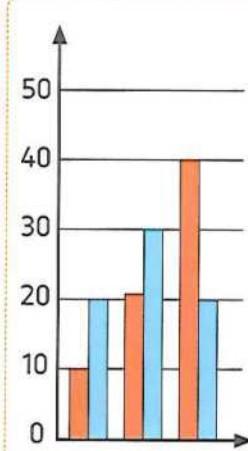
Bar graph   **Double bar graph**   **Line graph**
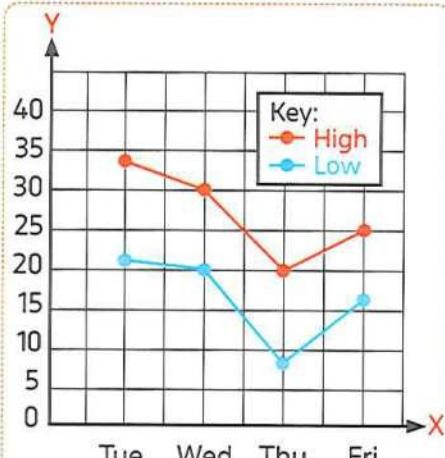
- Now, we are going to present another type of graphs called "pie chart".

What is a pie chart ?

A **pie chart** is a circle divided into slices (sectors). It is a simple way to show the size (or the fraction) that represents each item relative to the whole pie.
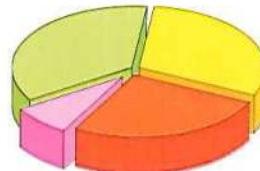
What is a circular sector ?

A **circular sector** is a part of a circular region which is bounded by an arc of the circle and two radii passing through the endpoints of this arc.
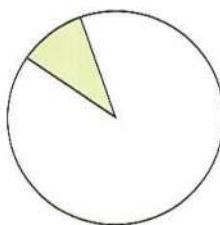
• When different items of data are presented on a pie chart, you can easily do a quick comparison between these items, and also between any item and the total.

🔔 **Remember**

• You have learnt before that a fraction can be represented by a part of a circle as the following :
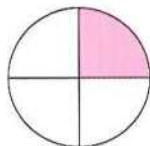
The coloured part represents $\frac{1}{4}$ of a circle	The coloured part represents $\frac{1}{2}$ of a circle	The coloured part represents $\frac{3}{4}$ of a circle	The coloured part represents $\frac{1}{10}$ of a circle	The coloured part represents $\frac{1}{5}$ of a circle
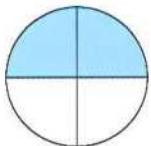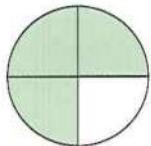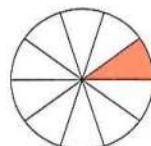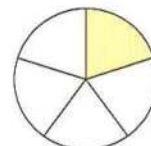
• You can use equivalent fractions to determine decimals :

$\frac{1}{4} = \frac{25}{100}$	$\frac{1}{2} = \frac{5}{10}$	$\frac{3}{4} = \frac{75}{100}$	$\frac{1}{10}$	$\frac{1}{5} = \frac{2}{10}$
$= 0.25$	$= 0.5$	$= 0.75$	$= 0.1$	$= 0.2$

For Example :

• The following pie chart represents the number of students who practice sports :

The number of students who practice sports → Title

10 students
20 students
10 students

☐ Football
☐ Basketball
☐ Volleyball → Key
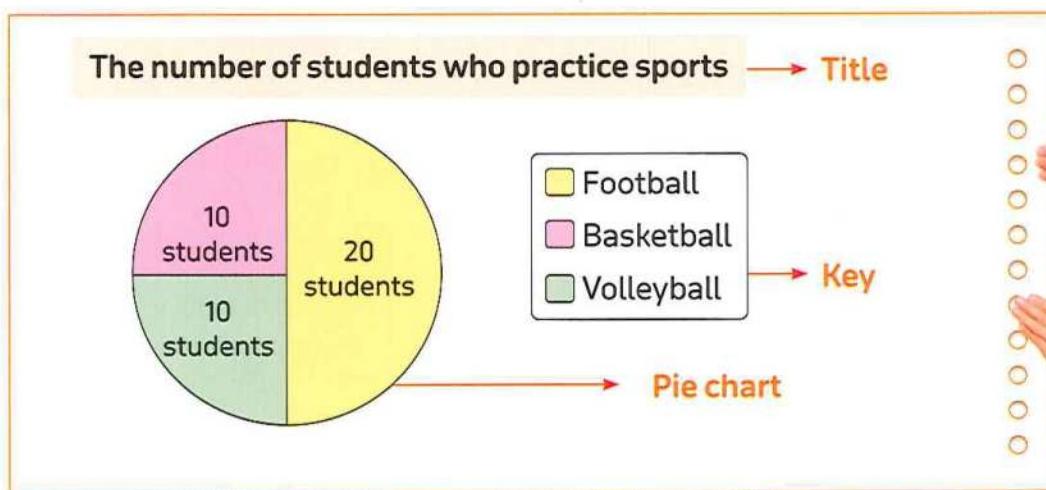
→ Pie chart

• Use the data from the pie chart to form the frequency table :

Sport	Football	Basketball	Volleyball
Frequency	20	10	10

- Use the frequency table (or pie chart) to get the fraction that represents any sport :

> The fraction that represents the item A = $\dfrac{\text{The value of item A}}{\text{Total values of all items}}$

* Football = $\dfrac{20}{40}$ = $\dfrac{1}{2}$ * Basketball = $\dfrac{10}{40}$ = $\dfrac{1}{4}$

* Volleyball = $\dfrac{10}{40}$ = $\dfrac{1}{4}$

So,

Sport	Football	Basketball	Volleyball
Fraction	$\dfrac{1}{2}$	$\dfrac{1}{4}$	$\dfrac{1}{4}$

- Use equivalent fractions to get their decimals :

* Football = $\dfrac{1}{2} = \dfrac{1 \times 5}{2 \times 5} = \dfrac{5}{10} = 0.5$ * Basketball = $\dfrac{1}{4} = \dfrac{1 \times 25}{4 \times 25} = \dfrac{25}{100} = 0.25$

* Volleyball = $\dfrac{1}{4} = \dfrac{1 \times 25}{4 \times 25} = \dfrac{25}{100} = 0.25$

So,

Sport	Football	Basketball	Volleyball
Decimal	0.5	0.25	0.25

Example 1

The opposite figure represents the different activities which Sally does during a day.

Study the figure, then answer the following questions :

a. Find the decimal of the time that Sally spends at school.

b. Find the decimal of the time that Sally spends in sleeping.

c. Find the decimal of the time that Sally spends in other things.

d. Complete : Sally spends the same decimal of the time in ——— and ———

e. What is the fraction that represents each activity ?
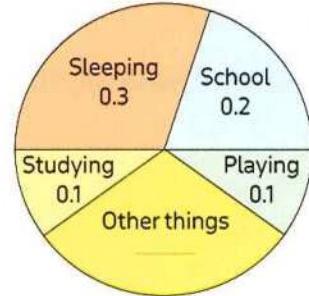
Solution

a. 0.2   b. 0.3

c. $1 - (0.3 + 0.2 + 0.1 + 0.1) = 1 - 0.7 = 0.3$

d. Studying , playing (or : sleeping , other things)

e. * Sleeping = $\dfrac{3}{10}$ * School = $\dfrac{2}{10} = \dfrac{1}{5}$ * Playing = $\dfrac{1}{10}$

   * Studying = $\dfrac{1}{10}$ * Other things = $\dfrac{3}{10}$

Activity	Sleeping	School	Playing	Studying	Other things
Fraction	$\dfrac{3}{10}$	$\dfrac{1}{5}$	$\dfrac{1}{10}$	$\dfrac{1}{10}$	$\dfrac{3}{10}$

Example 2

In the opposite circle :

a. Color $\frac{1}{2}$ of the circle red

, $\frac{1}{8}$ of the circle blue , $\frac{1}{8}$ of the circle green

and $\frac{1}{4}$ of the circle orange

b. If this pie chart represents 72 students surveyed.
How many students do the blue and green sections represent ?

c. What decimal of the group is orange ?

Solution

a.
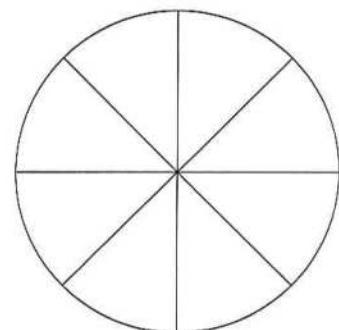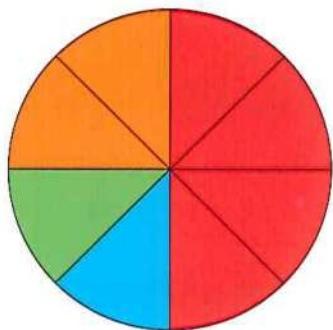
b. The number of students that represent the

blue and green sections $= \frac{1}{4} \times 72 = 18$ students.

c. The decimal of

$$\text{orange} = \frac{1}{4} = \frac{1 \times 25}{4 \times 25} = \frac{25}{100} = 0.25$$

Remarks

(1) Each circular sector has an angle whose vertex is the centre of the circle which is called a **"central angle"**.

(2) The sum of the measures of angles accumulating around at a point as the centre of the circle is equal to 360°
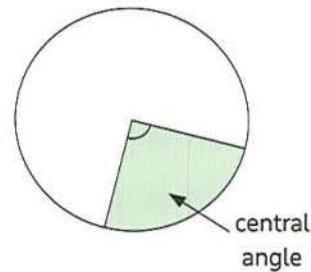
central angle

(3) The measure of the central angle that represents
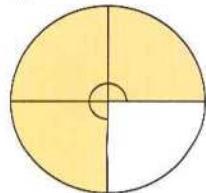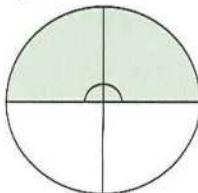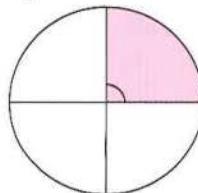
$\frac{3}{4}$ of a circle	$\frac{1}{2}$ of a circle	$\frac{1}{4}$ of a circle	$\frac{1}{8}$ of a circle
$= \frac{3}{4} \times 360° = 270°$	$= \frac{1}{2} \times 360° = 180°$	$= \frac{1}{4} \times 360° = 90°$	$= \frac{1}{8} \times 360° = 45°$
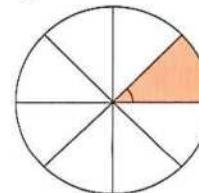
Example 3

Find the measure of the central angle that represents each of the following sectors.

a

b

c
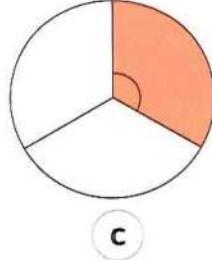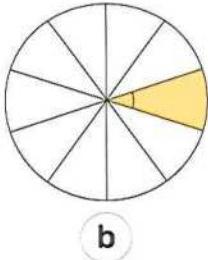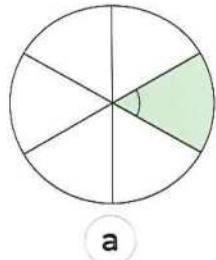
Solution

a. The measure of the central angle $= \frac{1}{6} \times 360° = 60°$

b. The measure of the central angle $= \frac{1}{10} \times 360° = 36°$

c. The measure of the central angle $= \frac{1}{3} \times 360° = 120°$

Example 4

The following figure represents the fractions of the favorite subjects of 200 pupils in a school.

Answer the following questions :

a. What is the decimal of the pupils who prefer Science ?

b. What is the decimal of the pupils who prefer English ?

c. What is the fraction of the pupils who prefer Mathematics ?

d. Which sector represents the smallest fraction ?

e. Find the measure of the central angle of Maths in degrees.

f. How many pupils prefer studying English ?
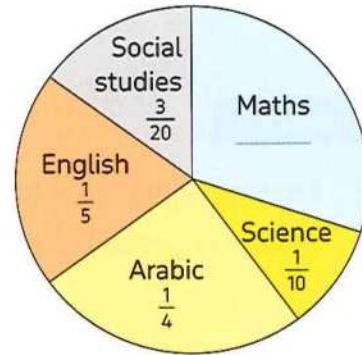
Solution

a. $\frac{1}{10} = 0.1$

b. $\frac{1}{5} = \frac{1 \times 2}{5 \times 2} = \frac{2}{10} = 0.2$

c. $1 - \left[\frac{3}{20} + \frac{1}{5} + \frac{1}{4} + \frac{1}{10}\right] = 1 - \left[\frac{3}{20} + \frac{4}{20} + \frac{5}{20} + \frac{2}{20}\right] = \frac{20}{20} - \frac{14}{20} = \frac{6}{20} = \frac{3}{10}$

d. Science.

e. The measure of the central angle of Maths $= \frac{3}{10} \times 360° = 108°$

f. The number of pupils $= \frac{1}{5} \times 200 = 40$ pupils.

Example 5

The following table shows the number of hours that Marwa spent in studying in different subjects in a week :

Arabic	Maths	Science	English	Total
6	12	3	3	24

Represent this data by a pie chart.
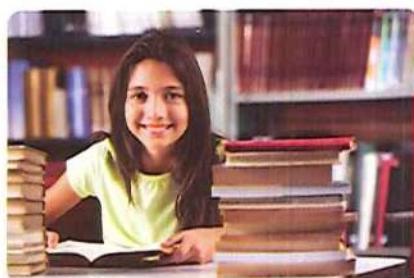
Solution

The total hours that Marwa studied is distributed among different items [Arabic , Maths , Science and English] , to represent this data by a pie chart, we do as follows :

Step 1

We find the fraction that represents each item as follows.

The fraction that represents the item A = $\dfrac{\text{The value of the item A}}{\text{Total values of all items}}$

* Arabic = $\dfrac{6}{24}$ = $\dfrac{1}{4}$ * Maths = $\dfrac{12}{24}$ = $\dfrac{1}{2}$

* Science = $\dfrac{3}{24}$ = $\dfrac{1}{8}$ * English = $\dfrac{3}{24}$ = $\dfrac{1}{8}$

Step 2

We draw a suitable circle and represent each item by a circular sector according to the fraction representing it.
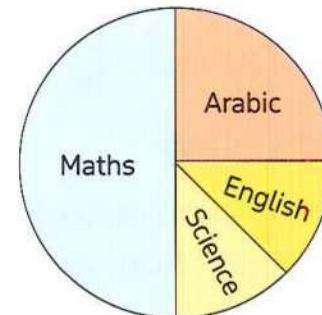
Example 6

When 36 students were asked about the best sport they like.

• $\dfrac{1}{2}$ of them answered like "football".

• $\dfrac{1}{4}$ of them answered like "swimming".

• $\dfrac{1}{4}$ of them answered like "volleyball".

a. Represent that given data using a pie chart.

b. How many students like swimming more than any other sports ?

Solution

a.
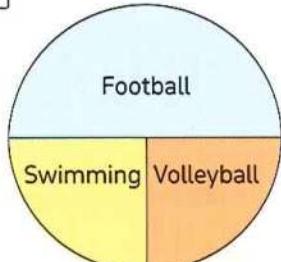
b. The number of students like swimming

$= \dfrac{1}{4}$ of the total number of students

$= \dfrac{1}{4} \times 36 = 9$ students.

Example 7

The opposite pie chart represents the favorite subjects of a group of 50 children :

1. Use the data from the pie chart to complete the frequency table.

Subject	Maths	Arabic	Science	English
Frequency	A. ——	B. ——	C. ——	D. ——
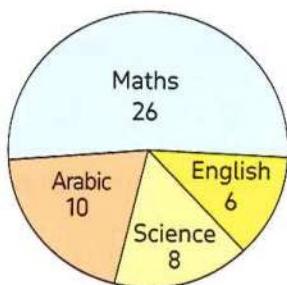
2. Use the frequency to find the fraction for each subject.

Subject	Maths	Arabic	Science	English
Fraction	A. ——	B. ——	C. ——	D. ——

Solution

1. A. 26   B. 10   C. 8   D. 6

2. A. Maths $= \dfrac{26}{50} = \dfrac{13}{25}$ B. Arabic $= \dfrac{10}{50} = \dfrac{1}{5}$

   C. Science $= \dfrac{8}{50} = \dfrac{4}{25}$ D. English $= \dfrac{6}{50} = \dfrac{3}{25}$

Remark

The number of people surveyed (the sample size) is very important to the reliability of date of the pie chart , as the increase of the sample size, the data is more reliable.

For Example :

Citizens in a small town (population 2,100) were surveyed to show the favorite T.V. programs.
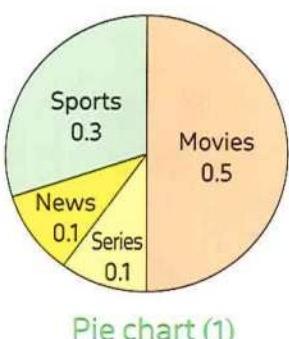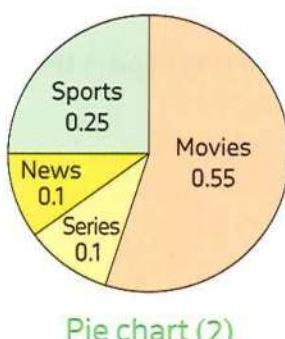
Pie chart (1)   Pie chart (2)   Pie chart (3)
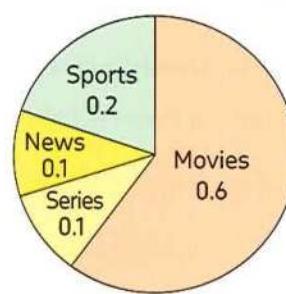
In pie chart (1) , 10 citizens were surveyed.

In pie chart (2) , 100 citizens were surveyed.

In pie chart (3) , 1,000 citizens were surveyed.

, then we notice that :

the pie chart (3) is more accurate [or reliable] because it has a largest sample size.

254

✓ **Check** your understanding

1. The opposite figure shows the fractions of time that Enas spends in studying different subjects.

   Complete :

   a. The decimal of the time that Enas spends in studying Maths is _____

   b. The measure of the central angle of science in degrees is _____

   c. The subject that needs more time is _____
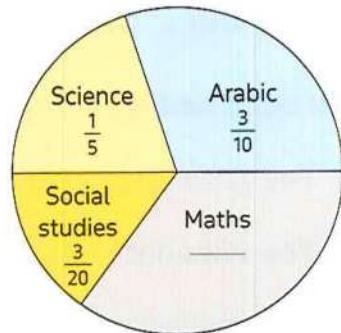
2. This table shows the distribution of 100 pupils according to the kind of sports they play :

Sports	Football	Basketball	Tennis
Number of pupils	50	25	25

Represent these data by a pie chart.

• **Introduction to Pie Charts**
• **Understanding Pie Charts**
• **Making Pie Charts**

● REMEMBER ● UNDERSTAND ● APPLY ⚫ PROBLEM SOLVING 📖 From the school book

1. The opposite figure shows the decimals of sales of different types of books. Complete :

a. The sales decimal of French books is _____

b. The sales decimal of Science books is _____

c. The least sales decimal is in _____

d. The ascending order of books types according to the decimals of sales is : _____ ,
_____ , _____ , _____ and _____
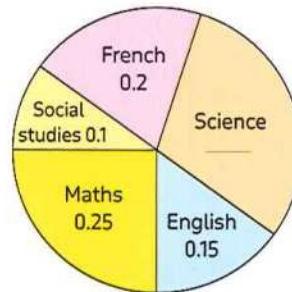
2. The opposite figure shows the favorite hobbies for 100 pupils in the fifth primary, study the figure, then answer.

a. What is the fraction of the theatre with respect to all hobbies ?

b. What is the fraction of the broadcast with respect to all hobbies ?

c. What is the measure of the central angle of the sector of the music ?

d. What is the hobby that the least pupils prefer ?

e. What is the hobby that the most pupils prefer ?
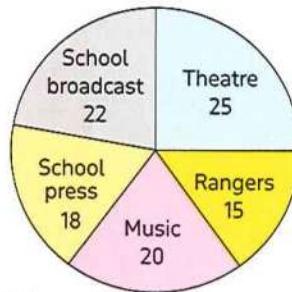
3. The opposite figure shows the distribution of the natural components of the earth's surface, study the figure, then complete the following table.

The components of the earth's surface	Water natural supplies	Vallies	Hills	Mountains
The decimal of the forming	_____	_____	_____	_____

a. What is the component which represents the smallest decimal of the earth's surface ?

b. What is the component which represents the greatest decimal of the earth's surface ?
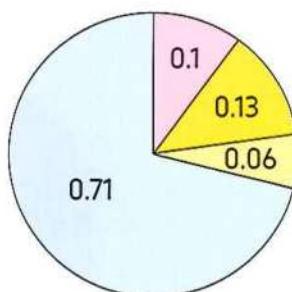
4. 📖 The results of the survey, "What sport do primary 5 students most prefer ?" are shown in the table. Look at the pie chart and talk to a partner about what you notice.

What sport do primary 5 students most prefer	
Sport	Number of students
Football	50
Basketball	25
Swimming	15
Gymnastics	10
Total	100

Football
Gymnastics
Basketball
Swimming
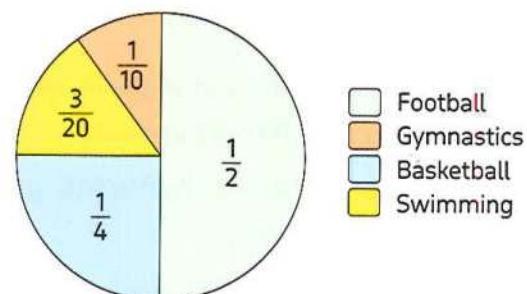
a. How many students were surveyed ? How do you know ?

b. Match each decimal to the correct section of the pie chart.

0.5   0.25   0.15   0.1

5. The opposite figure shows the fractions of the favorite animals sites at the zoo. Study the figure, then answer the questions.

a. Which animal site is favored by almost half of the people ?

b. Which two animals are favored by almost the same number of people ?

c. What is the fraction of lion site ?

d. What is the fraction of donkey and snake sites ?

6. 📖 Analyze the pie chart and answer the questions.

Favorite Types of Fruit

Pomegranates: 13
Bananas: 12
Figs: 25
Melon: 50

Melon
Figs
Bananas
Pomegranates
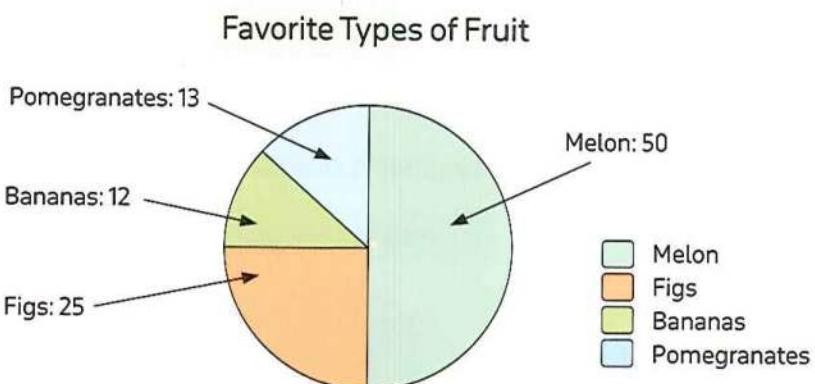
a. What fraction of the people surveyed like melon ?

b. What fraction of the people surveyed like figs ?

c. How many people were surveyed ?

d. Why is it important to label the chart with a title and include a key ?

7. 📖 **Read the problem and be prepared to discuss your ideas with the class.**

This is a pie chart without a title or a key. What could the pie chart represent?

Using the colors as a guide, what information can you gather about this pie chart?

Now, give the pie chart a title and label the key based on the clues listed.

- 100 students were surveyed.
- 50 students selected chocolate ice cream.
- The smallest number of students selected mint ice cream.
- Twice the number of students who selected mint selected pistachio.
- 10 students selected pistachio ice cream.
- The same number of students selected vanilla ice cream as pistachio and mint combined.
- 20 students selected mango ice cream.

a. Title: ————————————

b. Key: ————————————
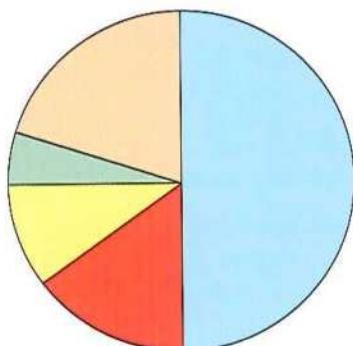
Color	Flavor	Number of students
Blue	___(A)___	___(B)___
Orange	___(A)___	___(B)___
Green	___(A)___	___(B)___
Yellow	___(A)___	___(B)___
Red	___(A)___	___(B)___

8. 📖 **Use the pie chart to answer your teacher's questions.**

Breakfast choices

Nothing — 10
Ful — 30
Beid Bel Basturma — 25
Fruit — 10
Taameya — 25
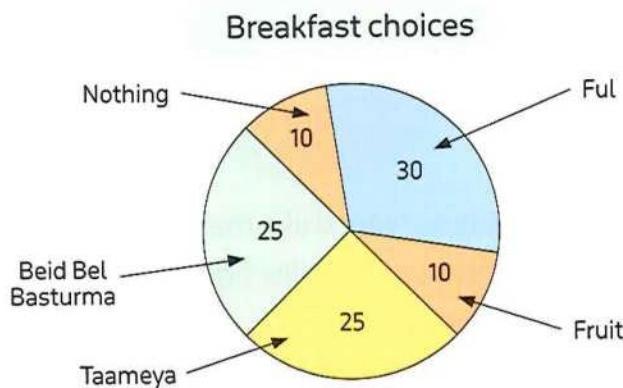
a. Use the data from the pie chart to complete the frequency table.

Food	Ful	Fruit	Taameya	Beid Bel Basturma	Nothing
Frequency	A. _____	B. _____	C. _____	D. _____	E. _____

b. Use the frequency to find the decimal for each breakfast option.

Food	Ful	Fruit	Taameya	Beid Bel Basturma	Nothing
Decimal	A. _____	B. _____	C. _____	D. _____	E. _____

c. Use the information from the tables in the previous two tasks to find the fractional equivalents for each breakfast option. Simplify the fractions.

Food	Ful	Fruit	Taameya	Beid Bel Basturma	Nothing
Fraction	A. _____	B. _____	C. _____	D. _____	E. _____

d. What was the most frequent breakfast choice ?

e. What two breakfast choices were chosen the least often ?

f. How many more students chose Beid Bel Basturma over fruit ?

g. Which two breakfast choices were chosen by half of the class ?

---

9. The following table shows the number of students who practice sports. Represent these data using the pie chart on the opposite figure.

Sport	Football	Basketball	Volleyball
Number of students	20	10	10

---
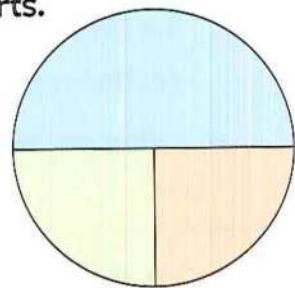
10. An employee spends his salary as follows.

L.E. 200 for clothes.

L.E. 800 for food.

L.E. 400 for transportation and medicine.

L.E. 200 for renting an apartment.

Graph that data on the opposite pie chart.
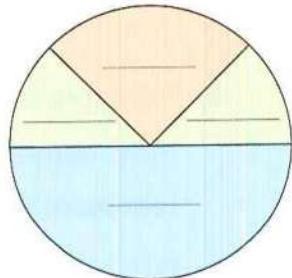
11. When some students were asked about the most popular TV programs, the following data were extracted.

$\frac{1}{2}$ of the students like to watch sports programs.

$\frac{1}{4}$ of the students like to watch cultural programs.

$\frac{1}{8}$ of the students like to watch Arabic and foreign movies.

$\frac{1}{8}$ of the students like to watch news.

a. Represent that given data using the opposite pie chart.

b. If the number of all students was 48 students,
what is the number of students who prefer watching each type of programs ?

---
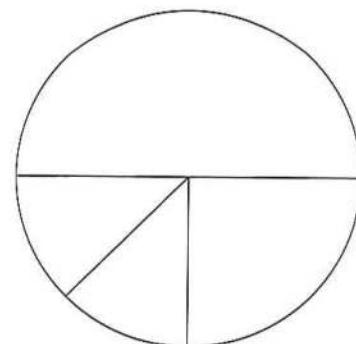
12. 📖 In the opposite circle.

a. Shade $\frac{1}{2}$ of the circle red. Shade $\frac{1}{4}$ of the circle blue. Shade $\frac{1}{12}$ yellow. Shade $\frac{1}{6}$ green.

b. If this pie chart represents 24 students surveyed, how many students does the red section represent ?

c. If this pie chart represents 24 students surveyed, how many students does the blue section represent ?

d. What decimal of the group is blue ?

---
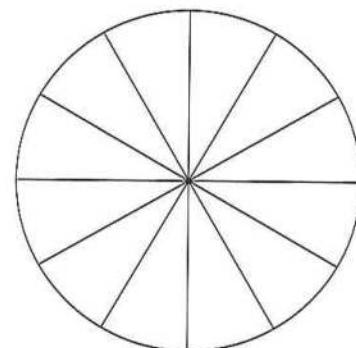
13. 📖 In the opposite circle.

a. Shade $\frac{3}{4}$ of the circle green, $\frac{1}{8}$ of the circle blue, and $\frac{1}{8}$ of the circle red.

b. If this pie chart represents 40 students surveyed, how many students do the red and blue sections represent ?

c. What decimal of the group is green ?
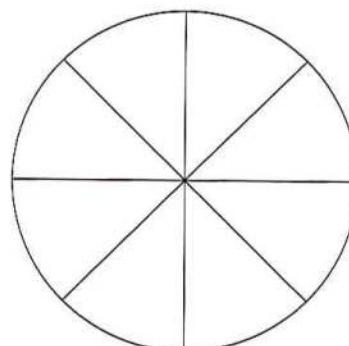
14. The following table shows the fractions of the number of hours that Marwa studied in different subjects in a week.

Subject	Arabic	Maths	Science	English
Fraction	$\frac{1}{10}$	$\frac{2}{5}$	$\frac{1}{5}$	$\frac{3}{10}$
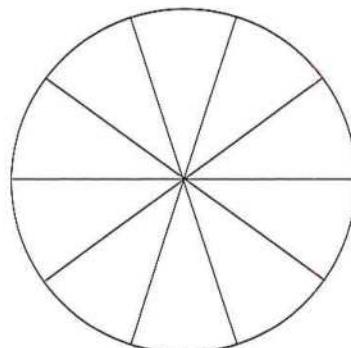
Represent these data by the opposite pie chart.

15. One of the families spends its salary as the following.
0.4 for food , 0.2 for house rent , 0.3 for expenses and saves the remainder, represent these data by using the circular sectors, then answer the following.

a. If the family monthly income is L.E. 900, so how much does the family save in the year ?

b. Another family spends its monthly salary by the same way and saves L.E. 70 monthly, so what is the monthly salary of the family ?
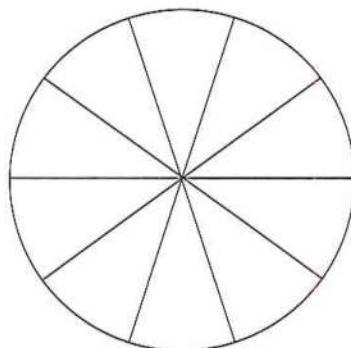
16. 📖 This frequency table shows the favorite ice cream flavors of a group of 50 children.

a. Fill in the fractions in the simplest form for each flavor.

Flavor	Mango	Vanilla	Mastic	Chocolate	Hazelnut
Frequency	5	25	6	12	2
Fractions	A. ———	B. ———	C. ———	D. ———	E. ———

b. Work with your teacher and classmates to shade and label the pie chart using the data from the table. Include a title and a key.

1. Title : ———————————

2. Key : ———————————
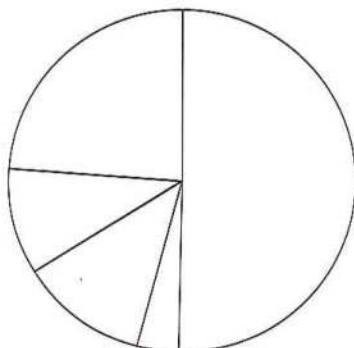
Flavor	Frequency	Fractions
Mango	5	A. ———
Vanilla	25	B. ———
Mastic	6	C. ———
Chocolate	12	D. ———
Hazelnut	2	E. ———

c. What is one question that could be answered by this pie chart ?

17. The following table shows the rate of the score of 200 students in one school of Cairo governorate :

Rate	Excellent	Good	Pass	Weak
Fraction	$\frac{3}{20}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{10}$

a. Represent these data by the opposite pie chart.

b. Find the number of excellent students.
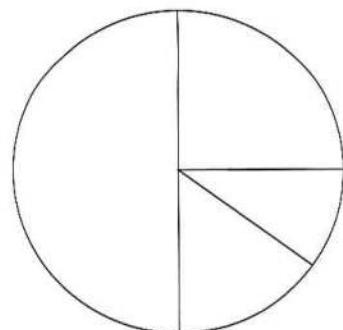
18. Complete each table.

a. Sample Size : 100 students.

Favorite Type of Vegetables	Molokhiyya	Radishes	Turnips	Carrots	Lettuce
Frequency	40	15	10	25	10
Fraction	——	——	——	——	——

b. Sample Size : 200 students.

Favorite Sport	Football	Tennis	Squash	Basketball	Gymnastics
Frequency	50	50	20	70	10
Fraction	——	——	——	——	——

c. Sample Size : 50 students.

Favorite Type of Vegetables	Molokhiyya	Radishes	Turnips	Carrots	Lettuce
Frequency	10	5	10	20	5
Fraction	——	——	——	——	——

19. 📖 For each task, select the circular degrees that match the fraction of the circle that is shaded. (A circle has 360 degrees).

a.
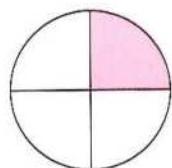
A. 180°   B. 45°
C. 60°   D. 90°

b.
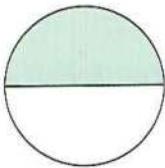
A. 180°   B. 90°
C. 120°   D. 45°

c.
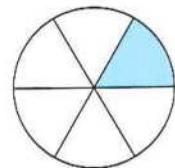
A. 50°   B. 120°
C. 60°   D. 30°

d.
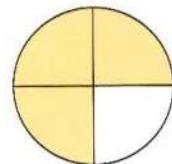
A. 60°   B. 270°
C. 150°   D. 120°

e.
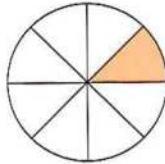
A. 45°   B. 60°
C. 30°   D. 90°

20. Citizens in a small town (population 2,340) were surveyed to determine where to spend money on education.

In Pie Chart A, 10 citizens were surveyed. In Pie Chart B, 100 citizens were surveyed, and in Pie Chart C, 1,000 citizens were surveyed.

Which pie chart most accurately represents the opinion of the town? Why?

Pie Chart A
Where to Spend Money on Education

Supplies — 0.2
Staff — 0.4
0.3
0.1
New Buildings
Field Trips
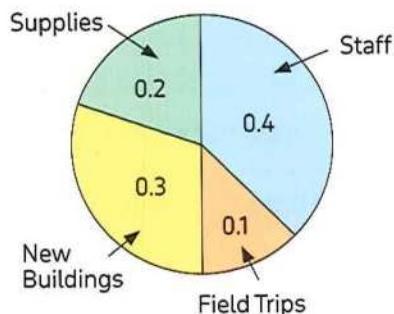
Pie Chart B
Where to Spend Money on Education

Supplies — 0.2
Staff — 0.65
New Buildings — 0.1
Field Trips — 0.05
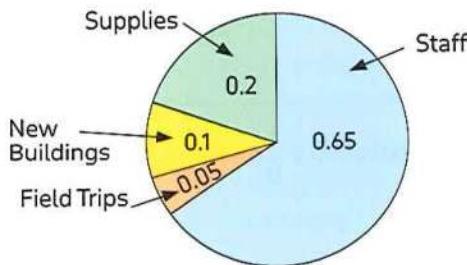
Pie Chart C
Where to Spend Money on Education

Supplies — 0.08
Staff — 0.6
New Buildings — 0.3
Field Trips — 0.02
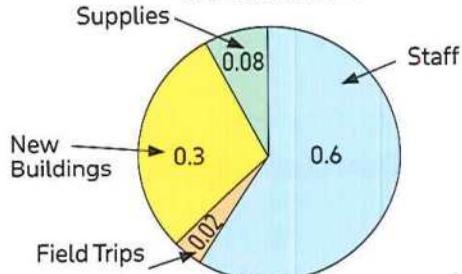
Choose the correct answer.

1. The measure of the central angle that represents the opposite colored sector is —————

A. 36°   B. 72°

C. 108°   D. 120°
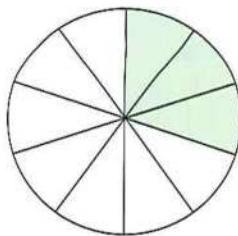
2. The following table shows the fractions of favorite colors of some children.

Color	Red	Blue	Green
Fractions	$\frac{1}{2}$	—————	$\frac{3}{10}$

What is the fraction that represents the red and blue colors together?

A. $\frac{1}{5}$ B. $\frac{1}{2}$ C. $\frac{3}{10}$ D. $\frac{7}{10}$

3. The opposite figure represents the fractions of the sports activities for the pupils of a school, their number is 960 pupils.

First : The fraction of the pupils participated in handball = —————

A. $\frac{1}{10}$ B. $\frac{1}{5}$

C. $\frac{3}{10}$ D. $\frac{2}{5}$
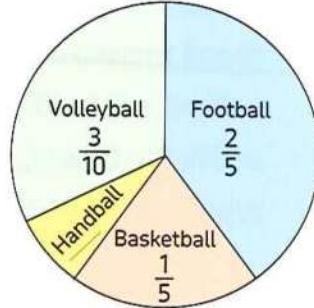
Second : The number of pupils who participated in football activity = ————— pupils.

A. 96   B. 384   C. 480   D. 672

4. The following table shows the number of studying hours that Tamer did in a week :

Subject	Arabic	Maths	Science	English	Social studies	Total
Number of hours	6	10	7	9	4	36

, then the decimal of English = —————

A. 0.2   B. 0.25   C. 0.3   D. 0.35

5. The measure of the central angle of the circular sector that represents $\frac{1}{8}$ the circle is ————— °

A. 30   B. 45   C. 60   D. 90

6. A librarian made an inventory of the books in his library and their types. He found the following :

$\frac{1}{4}$ of the books are religious, $\frac{1}{4}$ of the books are literary ,

$\frac{1}{2}$ of the books are scientific.

If the total of books was 800, then the number of scientific books = ————

A. 100   B. 200   C. 400   D. 600
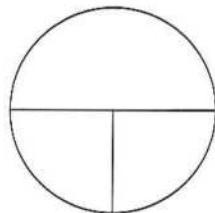
7. The opposite figure represents the decimals of the sport activities for the pupils in a class of a school, their number is 40 pupils, then the number of pupils who participated in basketball = ———— pupils.

A. 20   B. 12

C. 8   D. 5
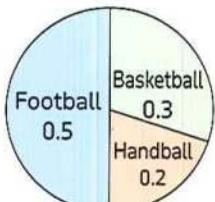
8. The opposite pie chart shows the results of a survey that was carried out to find out how students travel to school.

Answer the following questions :

First : What is the most common method of travel ?

A. Walk   B. Bus   C. Taxi   D. Metro
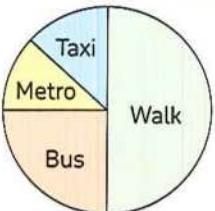
Second : What is the fraction that represents the number of students travelling to school on foot relative to the whole number ?

A. $\frac{1}{8}$ B. $\frac{1}{4}$ C. $\frac{1}{3}$ D. $\frac{1}{2}$

Third : If the number of students travelling to school by taxi was 10, how many students took part in the survey ?

A. 20   B. 40   C. 60   D. 80

9. In the opposite figure , the measure of the central angle of the colored circular sector equals ———— °

A. 360   B. 100

C. 130   D. 230
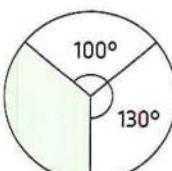
10. The following table shows the fractions of chicken production for three farms during October :

The farm	First	Second	Third
The fractions	$\frac{1}{4}$	$\frac{1}{2}$	————

, then the representation of these data by the pie chart is ————
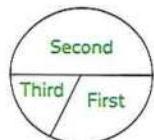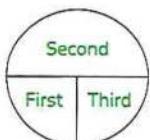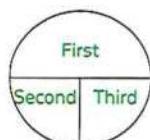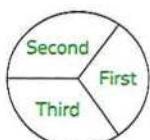
A.   B.   C.   D.

Glossary

A

acute   زاوية حادة
An angle measuring less than 90°.

algorithm   خوارزمية
A step-by-step method for computing.

angle   زاوية
Two rays that share an endpoint.

area   مساحة
The measure, in square units, of the inside of a plane figure.

area model   نموذج مساحة المستطيل
A model of multiplication that shows each place value product.

attribute   خاصية
A characteristic or property of an object, such as color, shape, size, and so on.

B

base   قاعدة
Any side of a plane figure. Usually thought of as a side where the figure "sits".

benchmark   معيار
A known size or amount that can be used as a reference to help understand a different size or amount. Benchmarks can be helpful in estimation and in checking the reasonableness of answers.

benchmark fractions   كسور معيارية
Fractions that are commonly used for estimation. Benchmark fractions are useful when comparing and ordering. One-half, one-third, one-fourth, three-fourths, and two-thirds are all benchmark fractions.

brackets   أقواس
Symbols used in pairs to group things together.

C

capacity   سعة
The amount of liquid a container can hold.

compound shape   شكل هندسي مركّب
Any shape that is made up of two or more geometric shapes.

cone   مخروط
A solid object that has a circular base joined to a point by a curved side.

congruent   متطابق
Having exactly the same size and shape.

coordinate   محور
A set of values that show an exact position.

coordinate plane   مستوى إحداثي
A two-dimensional system in which a location is described by its distances from two perpendicular reference lines (axes). Also called a coordinate grid.

cube   مكعب
A box-shaped solid object that has six identical square faces.

cubic units   وحدات مكعبة
A number, multiplied by itself and then multiplied again by itself.

cylinder   أسطوانة
A solid object with two identical flat ends that are circular or elliptical and one curved side.

D

degree   درجة (وحدة قياس الزاوية)
Unit of measuring angle.

denominator   مقام
The quantity below the line in a fraction. It tells how many equal parts are in the whole.

dimension   بُعد
A measurement of length in one direction.

E

edge   حرف
A line segment on the boundary joining one vertex to another.

equilateral   مثلث متساوى الأضلاع
Having all sides of equal length.

equivalent مكافئ
Having the same value.

estimate يُقدّر
To find a number close to an exact amount; an estimate tells about how much or about how many.

exponent أُس
A symbol written above and to the right of a mathematical expression to indicate the operation of raising to a power.

F

face وجه
Any of the individual flat surfaces of a solid object.

formula قانون
A rule that is written as an equation. $A = l \times w$

fraction كسر اعتيادي
A way to describe a part of a whole or a part of a group by using equal parts.

I

improper fraction كسر غير حقيقي
A fraction in which the numberator is larger than or equal to the denominator.

input مُدخَل
The known variable you feed into an expression.

intersect يتقاطع
A signle point where two lines meet or cross each other.

intersecting متقاطع
Two or more lines cross each other in a plane, sharing a common point.

irregular polygon مضلع غير منتظم
A polygon that does not have all sides equal and all angles equal.

isosceles مثلث متساوي الساقين
A triangle having two sides equal in length.

L

layers طبقات

Horizontal segments of a three-dimensional figure; used for calculating the volume of the figure by decomposing it.

like denominators متحدة المقام
Denominators in two or more fractions that are the same.

line graph خطوط بيانية
A type of chart used to show information that changes over time.

M

mixed number العدد الكسري
A number that has a whole number and a fraction.

N

numerator بسط
The number written above the line in a fraction. It tells how many equal parts are described in the fraction.

O

obtuse زاوية منفرجة
An angle measuring greater than 90°.

ordered pair زوج مرتب
A pair of numbers used to locate a point on a coordinate plane; the pair is written in the form [x-coordinate, y-coordinate]; x-coordinate is the perpendicular distance of the point from the y-axis; the y-coordinate is the perpendicular distance of the point from the x-axis.

origin نقطة الأصل
In a coordinate plane, the point at the intersection of the x-and y-axes; the point (0, 0).

output مُخرج
What comes out of the function; the solution.

overestimate تقدير بقيمة أكبر
An estimate that is greater than the actual answer to a problem.

P

parallel متوازي
Always the same distance apart and never touching.

perimeter   محيط
The distance around the outside of a figure.

perpendicular   متعامد
Two lines intersecting each other at 90° or a right angle.

pie chart   قطاع دائرى
A type of graph in which a circle is divided into sectors that each represent a proportion of the whole.

R

ray   شعاع
A part of a line that has one endpoint and goes on forever in one direction.

rectangular prism   متوازى مستطيلات
A solid object that has six faces that are rectangles.

right angle   زاوية قائمة
An angle that measures exactly 90°.

S

sample size   حجم العينة
A selection taken from a larger group (the "population") that provides information about the larger group.

scalene   مثلث مختلف الأضلاع
A triangle having three sides unequal in length.

slices   شرائح
Vertical segments of a three-dimensional figure; used for calculating the volume of the figure by decomposing it.

sphere   كرة
A three-dimensional object shaped like a ball.

square pyramid   هرم مربع القاعدة
A three-dimensional geometric shape that has a square base and four triangular bases that are joined at a vertex.

survey size   حجم الاستبيان
The measure of the number of individual surveys used in an experiment.

T

tiling   تبليط
Overlay of individual tiles that cover the plane without gaps or overlaps; strategy for calculating area.

U

underestimate   تقدير بقيمة أقل
An estimate that is less than the actual answer to a problem.

unit fraction   وحدة كسرية
A fraction that has 1 as its numerator. A unit fraction names 1 equal part of a whole.

unit squares   وحدات مربعة
A unit square is a square whose sides have length 1.

unlike denominators   غير متحدة المقام
Bottom numbers of two or more fractions that are not equal.

V

vertex   رأس
The point at which two line segments, lines, or rays meet to form an angle.

vertices   رءوس
The point where the edges of a solid figure meet.

X

x-axis   المحور X
The horizontal axis on the coordinate plane.

x-coordinate   الإحداثى X
The first number in an ordered pair; tells whether to move right or left along the x-axis of the coordinate plane.

Y

y-axis   المحور y
The vertical axis on the coordinate plane.

y-coordinate   الإحداثى y
The second number in an ordered pair; tells whether to move up or down along the y-axis of the coordinate plane.

EL-MOASSER

Mathematics

By a group of supervisors

FREE PART **1** Step by Step Revision

SECOND TERM

5th PRIMARY 2023

Cumulative Assessments

Cumulative Assessment **1** On lesson (1) unit 7

1. Complete the following.

a. The LCM of denominators of $\frac{5}{7}$ and $\frac{3}{4}$ is _____
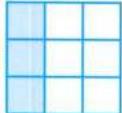
b. The shaded part [grid] represents $\frac{}{3}$

c. The smallest like denominator of $\frac{5}{6}$ and $\frac{3}{4}$ is _____

d. $\frac{7}{12} - \frac{3}{12} =$ _____   e. $1 - \frac{1}{8} =$ _____   f. $\frac{5}{8} +$ _____ $= \frac{3}{4} + \frac{1}{4}$

2. Choose the correct answer from these ones.

a. The simplest form of $\frac{12}{18}$ is _____

   A. $\frac{2}{8}$ **B.** $\frac{2}{3}$ **C.** $\frac{18}{12}$ **D.** 1

b. The LCM of denominators of $\frac{1}{2}$ and $\frac{3}{10}$ is _____

   A. 1   **B.** 2   **C.** 3   **D.** 10

c. Which of the following is correct ?

   A. $\frac{3}{4} = \frac{4}{3}$ **B.** $\frac{5}{8} = \frac{15}{18}$ **C.** $\frac{1}{2} = \frac{6}{12}$ **D.** $\frac{3}{5} = \frac{5}{7}$

d. The two fractions $\frac{1}{5}$ and $\frac{1}{4}$ are equivalent to the two common denominator fractions _____

   A. $\frac{4}{5}$ and $\frac{5}{4}$ **B.** $\frac{4}{9}$ and $\frac{5}{9}$ **C.** $\frac{4}{45}$ and $\frac{5}{45}$ **D.** $\frac{5}{20}$ and $\frac{4}{20}$

e. $\frac{3}{7} + \frac{4}{7} =$ _____

   A. $\frac{7}{14}$ **B.** 1   **C.** $\frac{34}{77}$ **D.** $1\frac{7}{7}$

f. $\frac{5}{15}$ _____ $\frac{1}{3}$

   A. $>$ **B.** $<$ **C.** $=$

3. a. Mazen ate $\frac{1}{2}$ of a pizza and Essam ate $\frac{1}{3}$ of the same pizza.
   Write their fractions with like denominators using a visual model.

   _____

b. Essam spent $\frac{1}{6}$ of his salary for renting a flat and $\frac{3}{4}$ of his salary for eating and clothing.
   Write their fractions with like denominators.

   _____

Cumulative Assessment **2** **Till lessons (2 & 3) unit 7**

1. **Complete the following.**

   a. The shaded part of [grid figure] represents $\dfrac{\quad}{2}$

   b. $\dfrac{3}{4} - \dfrac{1}{4} = \dfrac{\quad}{2}$

   c. $\dfrac{7}{8} + \dfrac{2}{5}$ is estimated as $1 + \underline{\hspace{2cm}}$

   d. The LCM of denominators of $\dfrac{3}{4}$ and $\dfrac{3}{5}$ is $\underline{\hspace{2cm}}$

2. **Choose the correct answer from these ones.**

   a. Which of the following is overestimate ?

   A. $\dfrac{9}{8} + \dfrac{1}{3}$ is about 1

   B. $\dfrac{1}{7} + \dfrac{1}{4}$ is about 0

   C. $\dfrac{2}{5} + \dfrac{3}{8}$ is about 1

   D. $\dfrac{10}{12} + \dfrac{4}{5}$ is about 1

   b. By using the fraction tiles , the difference $\dfrac{1}{2} - \dfrac{1}{5} = \underline{\hspace{2cm}}$

   A. $\dfrac{1}{3}$ B. $\dfrac{3}{10}$ C. $\dfrac{1}{4}$ D. $\dfrac{1}{7}$

   c. Estimate the sum of $\dfrac{3}{5} + \dfrac{7}{8}$ using benchmarks , the sum is $\underline{\hspace{2cm}}$

   A. 2   B. $1\dfrac{1}{2}$ C. 1   D. $\dfrac{1}{2}$

   d. $\dfrac{1}{6} + \dfrac{6}{7}$ is estimated as $\underline{\hspace{2cm}}$

   A. $\dfrac{1}{2} + \dfrac{1}{2}$ B. $0 + 1$ C. $0 + \dfrac{1}{2}$ D. $\dfrac{1}{2} + 1$

3. **Estimate the sum using the benchmarks, then indicate whether the estimation is overestimate or underestimate.**

   a. $\dfrac{2}{5} + \dfrac{3}{7}$

   b. $\dfrac{7}{12} + \dfrac{12}{11}$

   c. $\dfrac{1}{3} + \dfrac{1}{9}$

   d. $\dfrac{9}{10} + \dfrac{8}{9}$

4. **Use the fraction tiles to evaluate each sum or difference.**

   a. $\dfrac{7}{10} - \dfrac{1}{2}$

   b. $\dfrac{2}{4} - \dfrac{2}{8}$

   c. $\dfrac{3}{10} - \dfrac{1}{5}$

   d. $\dfrac{5}{8} + \dfrac{1}{4}$

Cumulative Assessment **3** **Till lessons (4 & 5) unit 7**

1. Complete the following.

a. $1 - \dfrac{1}{3} - \dfrac{2}{5} = $ _____

b. Using benchmarks, $\dfrac{8}{9} - \dfrac{1}{7} = $ _____ − _____ = _____

c. $\dfrac{6}{7} + \dfrac{1}{42} = $ _____

d. $\dfrac{1}{6} + \dfrac{5}{8} = $ _____

e. + = _____
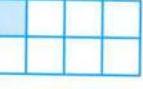
f. $\dfrac{7}{12} + \dfrac{9}{10}$ is estimated as _____

2. Choose the correct answer from these ones.

a. + = _____
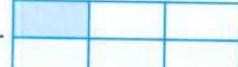
   A. $\dfrac{8}{12}$ B. $\dfrac{7}{12}$ C. $\dfrac{7}{6}$ D. $\dfrac{5}{6}$

b. $\dfrac{3}{4} - \dfrac{3}{5} = $ _____

   A. $\dfrac{3}{20}$ B. $\dfrac{3}{1}$ C. $\dfrac{27}{20}$ D. 1

c. $1 + \dfrac{7}{10} + \dfrac{1}{5} = $ _____

   A. $\dfrac{9}{15}$ B. $\dfrac{9}{10}$ C. $\dfrac{19}{10}$ D. $9\dfrac{1}{10}$

d. $\dfrac{5}{8} + \dfrac{1}{2} = 1 + $ _____

   A. $\dfrac{1}{2}$ B. $\dfrac{1}{8}$ C. $\dfrac{1}{5}$ D. $\dfrac{3}{4}$

e. Which of the following is not equivalent to $\dfrac{6}{8}$?

   A. $\dfrac{3}{4}$ B. $\dfrac{60}{80}$ C. $\dfrac{12}{18}$ D. $\dfrac{30}{40}$

f. When estimate the sum of $\dfrac{1}{4} + \dfrac{11}{10}$ is about 1 , the estimation is _____

   A. Overestimate.   B. Underestimate.

3. Estimate each sum or difference, then evaluate each expression by rewriting the fractions with like denominators.

a. $\dfrac{11}{12} + \dfrac{7}{8}$ b. $\dfrac{5}{6} + \dfrac{2}{3}$ c. $\dfrac{9}{10} - \dfrac{1}{5}$ d. $\dfrac{3}{7} - \dfrac{1}{8}$

Cumulative Assessment **4** **Till lesson (6) unit 7**

1. **Choose the correct answer from these ones.**

a. $\dfrac{9}{12} - \dfrac{5}{12} = $ _____

     A. 4   B. $\dfrac{1}{3}$ C. $\dfrac{14}{12}$ D. $\dfrac{1}{4}$

b. $1 - \dfrac{1}{2} - \dfrac{1}{3} = $ _____

     A. $\dfrac{1}{2}$ B. $\dfrac{1}{3}$ C. $\dfrac{1}{5}$ D. $\dfrac{1}{6}$

c. The GCF of numerator and denominator of $\dfrac{27}{18}$ is _____

     A. 1   B. 3   C. 9   D. 18

d. $\dfrac{1}{4} + \dfrac{8}{9}$ is estimated as _____

     A. 0   B. $\dfrac{1}{2}$ C. 1   D. $1\dfrac{1}{2}$

---

2. Marvina has a full bottle of juice. If she drinks $\dfrac{4}{7}$ of the juice and her sister drinks $\dfrac{2}{5}$ of the juice. **How much juice is left in the bottle ?**

   _____

---

3. Sandy made two types of cookies. She used $\dfrac{2}{3}$ cup of sugar for one recipe and $\dfrac{1}{4}$ cup of sugar for the other. **How much sugar did she use in all ?**

   _____

---

4. Youssef went out for a long walk. Youssef walked $\dfrac{3}{4}$ kilometers and then sit down to take a rest , then Youssef walked $\dfrac{3}{8}$ kilometers. **How far did Youssef walk altogether ?**

   _____

---

5. An octopus weighed $\dfrac{5}{6}$ kilogram. After two weeks , its weight was increased by $\dfrac{3}{10}$ kilogram but afterwards , it lost $\dfrac{1}{5}$ kilogram of its weight as it was sick. **What is the weight of the octopus now ?**

   _____

Cumulative Assessment **5** Till lessons (1 to 3) unit 8

1. Find the result of each of the following.

a. $7\frac{2}{7} + 1\frac{3}{7} = $ _____

b. $2\frac{1}{4} - 1\frac{3}{4} = $ _____

c. $2\frac{5}{6} + 3\frac{1}{6} = $ _____

d. $1\frac{7}{9} - 1\frac{4}{9} = $ _____

2. Choose the correct answer from these ones.

a. $1\frac{5}{11} + 2\frac{1}{8}$ estimate as _____

    A. $1 + 2$ B. $1 + 2\frac{1}{2}$ C. $1\frac{1}{2} + 2$ D. $2 + 2$

b. If $5\frac{1}{4} - 4\frac{a}{4} = \frac{3}{4}$, then $a = $ _____

    A. 1 B. 2 C. 3 D. 4

c. The mixed number $2\frac{1}{7}$ can be regrouped as _____

    A. $1\frac{8}{7}$ B. $2\frac{8}{7}$ C. $1\frac{1}{14}$ D. $1\frac{7}{8}$

d. $1\frac{1}{2} + 7\frac{1}{2} = $ _____

    A. $8\frac{1}{2}$ B. 9 C. 8 D. $8\frac{1}{4}$

3. Rewrite the given two mixed numbers with like denominators.

a. $1\frac{2}{5}$ and $3\frac{28}{35}$

b. $2\frac{3}{4}$ and $2\frac{8}{30}$

c. $4\frac{4}{6}$ and $3\frac{3}{15}$

d. $3\frac{1}{7}$ and $1\frac{8}{14}$

4. Complete the following.

a. If $X + 2\frac{1}{8} = 5\frac{3}{8}$, then $X = $ _____

b. $8\frac{2}{3} + 1\frac{5}{6}$ is estimated as _____ + _____

c. If $\frac{23}{5}$ is equivalent to $m\frac{3}{5}$, then $m = $ _____

d. If $y - 3\frac{1}{4} = 3\frac{3}{4}$, then $y = $ _____

Cumulative Assessment **6** **Till lessons (4 to 6) unit 8**

1. **Choose the correct answer from these ones.**

   a. If $2\dfrac{1}{4} - n = \dfrac{3}{4}$, then $n =$ _____

       A. 2   B. $\dfrac{3}{4}$ C. 3   D. $1\dfrac{1}{2}$

   b. If $5\dfrac{1}{4} + 2\dfrac{3}{4} = X - \dfrac{1}{3}$, then $X =$ _____

       A. $8\dfrac{1}{3}$ B. 8   C. $7\dfrac{3}{4}$ D. $7\dfrac{2}{3}$

   c. Which of the following is overestimate ?

       A. $\dfrac{2}{5} + \dfrac{3}{7}$ is about 1   B. $\dfrac{5}{6} + \dfrac{5}{7}$ is about 1

       C. $\dfrac{7}{8} + \dfrac{1}{3}$ is about 1   D. $\dfrac{11}{10} + \dfrac{7}{6}$ is about 2

   d. The equivalent fraction of $\dfrac{3}{6}$ is _____

       A. $\dfrac{3}{5}$ B. $\dfrac{2}{6}$ C. $\dfrac{15}{30}$ D. $\dfrac{2}{5}$

2. **Complete the following.**

   a.

   b. If $3\dfrac{1}{5} - 2\dfrac{3}{5} = a\dfrac{6}{5} - 2\dfrac{3}{5}$, then $a =$ _____

   c. If $5\dfrac{3}{7} - 1\dfrac{4}{7} = 5\dfrac{6}{7} - a$, then $a =$ _____

   d. $5\dfrac{1}{4} + 3\dfrac{2}{9} =$ _____

3. **Use the number line to find the difference.**

   a. $4\dfrac{1}{3} - 1\dfrac{1}{2}$ b. $6\dfrac{4}{5} - 4\dfrac{1}{4}$

4. Hany collected $5\dfrac{1}{4}$ kilograms of honey. He gave his brother $2\dfrac{3}{7}$ kilograms of them. How many kilograms are left ?

Cumulative Assessment **7** **Till lessons (7 & 8) unit 8**

1. Choose the correct answer from these ones.

a. $5 - \dfrac{1}{2} - \dfrac{1}{3} = $ _____

    A. $4\dfrac{5}{6}$ B. $4\dfrac{1}{2}$ C. $4\dfrac{1}{6}$ D. $4\dfrac{3}{4}$

b. If $3\dfrac{1}{7} = 2\dfrac{X}{7}$ by regrouping , then X = _____

    A. 1   B. 2   C. 3   D. 8

c. $2\dfrac{1}{2}$ days = _____ hours.

    A. $\dfrac{5}{2}$ B. 48   C. 36   D. 60

d. The simplest form of $\dfrac{24}{36}$ is _____

    A. $\dfrac{12}{18}$ B. $\dfrac{6}{9}$ C. $\dfrac{8}{12}$ D. $\dfrac{2}{3}$

2. Marwan ate $1\dfrac{1}{2}$ pieces of chocolate. His friend Wael ate $\dfrac{3}{4}$ pieces of chocolate more than him. **How many pieces did they eat together ?**

_____

_____

3. Complete the following.

a. $\dfrac{1}{5}$ minute = _____ seconds.   b. $2\dfrac{1}{4}$ years = _____ months.

c. 18 hours = _____ day.   d. 200 minutes = _____ hours.

e. $5\dfrac{1}{2} - \dfrac{3}{4} = $ _____   f. $2\dfrac{1}{4} + 2\dfrac{1}{4} = $ _____

4. Jack bought $1\dfrac{1}{4}$ kg of tomato and $\dfrac{1}{2}$ kg of onion. His sister Julia bought $2\dfrac{3}{4}$ kg of fruits. **How many kilograms did they buy ?**

_____

5. In first day , Youssef run for $1\dfrac{1}{2}$ hours. In second day , he run for $1\dfrac{3}{8}$ hours. In third day , he run for 80 minutes. **How long did Youssef run in the three days ?**

_____

_____

Cumulative Assessment **8** **Till lessons (1 & 2) unit 9**

1. Choose the correct answer from these ones.

   a. If $\frac{4}{7} \times 14 = a \times 4$, then a = _____

       A. 3   B. 7   C. 14   D. 2

   b. The like denominator of $\frac{3}{7}$ and $\frac{1}{14}$ is _____

       A. 3   B. 7   C. 14   D. 1

   c. $2\frac{1}{4} \times \frac{13}{14}$ is _____ $2\frac{1}{4}$

       A. less than   B. greater than   C. equal to

   d. If $7\frac{1}{2} \times \frac{4}{a}$ is greater than $7\frac{1}{2}$, then a may be _____

       A. 3   B. 4   C. 5   D. 6

   e. If $4\frac{m}{17}$ is about 4 , then m may be _____

       A. 2   B. 8   C. 10   D. 17

   f. $\frac{3}{4} + \frac{1}{4} =$ _____

       A. $\frac{4}{8}$ B. $\frac{3}{16}$ C. $\frac{8}{8}$ D. $\frac{31}{44}$

2. Complete the following.

   a. $1\frac{1}{4} - \frac{5}{8} =$ _____   b. If $\frac{4}{5} \times b = \frac{4}{5} + \frac{2}{5}$, then b = _____

   c. $6 \times 4 + \frac{2}{3} \times 4 =$ _____ $\times 4$

   d. The opposite area model represents _____ $\times$ _____

   e. $\frac{7}{10} - \frac{3}{10} =$ _____   f. $1 + \frac{1}{3} + \frac{1}{2} =$ _____

$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$
$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$
$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$

3. a. Write at least three different multiplication expressions that have the same product as $\frac{6}{7} \times 10$.

   _____

   b. Wael spends $\frac{3}{7}$ of his money on candy and $\frac{1}{5}$ of his money on toys and saves the left money. **What fraction of money does Wael save ?**

   _____

   c. Ahmed studied Math for $2\frac{1}{4}$ hours and science for 45 minutes. **How many hours did Ahmed study in all ?**

   _____

11

Cumulative Assessment **9** Till lessons (3 & 4) unit 9

1. Complete the following.

a. $\dfrac{2}{3} \times$ _____ $= \dfrac{8}{15}$

b. $\dfrac{4}{5} + \dfrac{7}{6}$ is estimated as _____ $+$ _____ $=$ _____

c. If $\dfrac{4}{7} \times n = \dfrac{4}{7} + \dfrac{4}{7} + \dfrac{2}{7}$, then $n =$ _____

d. $0.5 \times 4 \times \dfrac{3}{7} =$ _____

2. Using the area models to evaluate each of the following.

a. $\dfrac{3}{5} \times \dfrac{1}{2}$

b. $1\dfrac{1}{3} \times 3$

c. $\dfrac{1}{4} \times \dfrac{1}{4}$

d. $\dfrac{3}{4} \times \dfrac{2}{2}$

3. Choose the correct answer from these ones.

a. The fraction $\dfrac{2}{4}$ is equivalent to _____

A. $\dfrac{12}{14}$

B. $\dfrac{6}{12}$

C. $\dfrac{6}{7}$

D. $\dfrac{20}{45}$

b. If $X + 3\dfrac{1}{8} = 5\dfrac{3}{8}$, then $X =$ _____

A. $8\dfrac{1}{2}$

B. $2\dfrac{2}{16}$

C. $4\dfrac{2}{8}$

D. $2\dfrac{1}{4}$

c. The product of $\dfrac{12}{13} \times 8$ is equivalent to _____

A. $\dfrac{3}{13} \times 24$

B. $\dfrac{8}{12} \times 13$

C. $\dfrac{6}{13} \times 16$

D. $\dfrac{12}{8} \times 13$

d. $2 \times 5 + \dfrac{2}{5} \times 5 =$ _____ $\times 2$

A. 2

B. $\dfrac{2}{5}$

C. 5

D. 6

4. Answer the following problems.

a. Sameh and Wael bought some cookies. Sameh ate $\dfrac{3}{8}$ of them and Wael ate $\dfrac{1}{3}$ of them. the left is 14 cookies.

   What is the number of cookies did Sameh and Wael buy ?

   _____

   _____

b. Wafaa's flower garden consists of $\dfrac{2}{9}$ cornflowers and $\dfrac{2}{3}$ roses. The rest of the garden's area is filled with grass.

   What fraction of the garden's area is grass ?

   _____

Cumulative Assessment **10** **Till lessons (5 to 7) unit 9**

1. Choose the correct answer from these ones.

a. $2\frac{3}{4} \times 1\frac{1}{2} = $ _____

     A. $2\frac{3}{8}$ B. $3\frac{3}{8}$ C. $4\frac{1}{8}$ D. $4\frac{1}{4}$

b. $\frac{5}{6} \times$ _____ $= 1$

     A. $\frac{5}{6}$ B. $\frac{4}{5}$ C. 1 D. $1\frac{1}{5}$

c. $3\frac{1}{4} - $ _____ $= 2\frac{1}{2}$

     A. $1\frac{1}{2}$ B. $\frac{4}{3}$ C. $\frac{3}{4}$ D. $\frac{13}{4}$

d. $\frac{2}{5} + \frac{3}{8} + 1 = $ _____

     A. $1\frac{31}{40}$ B. $1\frac{5}{13}$ C. $1\frac{5}{40}$ D. $1\frac{6}{40}$

2. Multiply each of the following and write the product in its simplest form.

a. $2\frac{1}{2} \times 1\frac{1}{2}$ [Using area model]

b. $4\frac{1}{3} \times 3$ [Using distributive property]

c. $3\frac{1}{5} \times 1\frac{1}{4}$ [Using improper fraction]

3. Complete the following.

a. $3\frac{1}{4} \times 1\frac{1}{2} = [3 + $ _____ $] \times [\frac{1}{2} + $ _____ $]$

b. _____ $\times 1\frac{1}{3} = \frac{9}{2} \times \frac{4}{3}$

c. If $3\frac{1}{5} + n = 4\frac{2}{3}$, then $n = $ _____

d. If $\frac{5}{7} = \frac{X}{28}$, then $X = $ _____

4. Put (< , > or =).

a. $2\frac{1}{8} \times \frac{7}{9}$ ◯ 1 b. $\frac{5}{7} \times \frac{3}{3}$ ◯ 1

c. $1\frac{1}{2} \times 1\frac{1}{2}$ ◯ $2\frac{1}{4}$ d. $6\frac{1}{4} \times \frac{3}{4}$ ◯ $6\frac{1}{4}$

13

Cumulative Assessment **11** **Till lesson (8) unit 9**

1. Complete the following.

a. $2\frac{2}{3} - 1\frac{1}{8} = $ _____

b. $1\frac{1}{8} \times 2\frac{2}{3} = $ _____

c. $1\frac{1}{8} + 2\frac{2}{3} = $ _____

d. $1\frac{1}{8} \times 2 = $ _____

e. $2\frac{3}{8} - 1\frac{5}{8} = $ _____

f. $1\frac{1}{3} - \frac{5}{8} = $ _____

2. Answer the following problems.

a. Petra lives $\frac{3}{4}$ km. from school. Paula lives $1\frac{1}{3}$ times as far away from school as Petra.

How far from school does Paula live ?

_____

b. Pierre had $10\frac{1}{2}$ L.E. in his pocket and $15\frac{3}{4}$ L.E. in his bank.

How much money did he have ?

_____

_____

3. Choose the correct answer from these ones.

a. By using the fraction tiles , the sum of $\frac{1}{3} + \frac{1}{4}$ equals _____

A. $\frac{2}{7}$ B. $\frac{7}{12}$ C. $\frac{2}{3}$ D. $\frac{1}{7}$

b. The mixed number $3\frac{1}{4}$ can be regroup as _____

A. $3 + \frac{1}{4}$ B. $4\frac{1}{3}$ C. $2\frac{5}{4}$ D. $\frac{13}{4}$

c. $\frac{25}{4}$ is equivalent to _____

A. $2\frac{5}{4}$ B. $5\frac{2}{4}$ C. $6 + \frac{1}{4}$ D. $4 + \frac{1}{6}$

4. Answer the following.

a. Youssef's dad said he will give him $7\frac{1}{2}$ L.E if he works one hour.

How much will he give him for 3 hours and 15 minutes ?

_____

b. Write two different multiplication expressions that have the same product as $\frac{12}{13} \times 16$

_____

Cumulative Assessment **12** **Till lessons (9 & 10) unit 9**

1. **Choose the correct answer from these ones.**

a. 7 bales of cotton shared by 3 manufacturers represented by ——————

    A. $3 \div 7$ **B.** $7 + 3$ **C.** $7 - 3$ **D.** $7 \div 3$

b. All the following expressions are equal except ——————

    A. $37 \div 5$ **B.** $7\frac{2}{5}$ **C.** $5\frac{2}{7}$ **D.** $6\frac{7}{5}$

c. $5\frac{X}{24}$ is slightly greater than $5\frac{1}{2}$, then X may be ——————

    A. 23   **B.** 9   **C.** 11   **D.** 13

d. If $3\frac{1}{4} + k = 7$, then k = ——————

    A. $3\frac{1}{4} + 7$ **B.** $7 - 3\frac{1}{4}$ **C.** $7\frac{1}{4} - 3$ **D.** $7\frac{1}{4} + 3$

e. If $13 \div 4 = a$, then a = ——————

    A. $4\frac{1}{4}$ **B.** $3\frac{1}{4}$ **C.** $4\frac{1}{3}$ **D.** $4 \div 13$

f. $1\frac{1}{3} \times \frac{6}{5}$ is greater than $1\frac{1}{3}$ because ——————

    A. $\frac{5}{6} < 1$ **B.** $\frac{6}{5} > 1$ **C.** $1\frac{1}{3} > 1$ **D.** $1\frac{1}{3} < 1$

2. **Complete the following.**

a. $2\frac{1}{3}$ hours = —————— hours and —————— minutes.

b. $13 \div 5 = $ —————— $+ 2$

c. If we divided 4 pizza among 3 persons, the share of each one is ——————

d. $2\frac{1}{3} \times 6 = (2 \times 6) + ($ —————— $\times 6)$.

e. If $17 \div 5 = 3\frac{2}{5}$, then the divisor is ——————

f. $\frac{12}{13} \times 8 = \frac{24}{13} \times$ ——————

3. a. The price of 9 notebooks is 55 L.E.
    Find the price of each notebook.

b. The price of each pen is $2\frac{1}{2}$ L.E.
    Find the price of 6 pens.

Cumulative Assessment **13** **Till lessons (11 & 12) unit 9**

1. Use the area model to find the result of :

a. $\frac{1}{4} \div 3 = $ _____

b. $1\frac{1}{3} \times 2\frac{1}{2} = $ _____

c. $4 \div \frac{1}{2} = $ _____

d. $2\frac{1}{2} - 1\frac{1}{4} = $ _____

2. Choose the correct answer from these ones.

a. If $\frac{1}{5} \div a = \frac{1}{10}$, then a = _____

   A. $\frac{1}{2}$ B. 5   C. $\frac{1}{5}$ D. 2
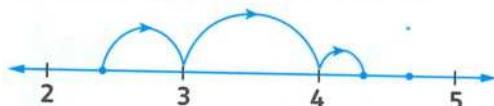
b. The opposite number line
is used to solve the problem _____

   A. $2\frac{1}{2} + 4\frac{1}{3}$ B. $4\frac{1}{3} - 2\frac{1}{2}$

   C. $2\frac{1}{3} + 4\frac{1}{2}$ D. $4\frac{1}{2} - 2\frac{1}{3}$

c. How many thirds are there in 2 ?

   A. 5   B. 2   C. 6   D. $\frac{3}{2}$

d. If $5\frac{1}{3} = X \div 3$, then X = _____

   A. 5   B. 51   C. 16   D. 15

3. Complete the following.

a. $5 \div \frac{1}{7} = $ _____

b. $5\frac{1}{7} = \frac{\quad}{7}$

c. The simplest form of $\frac{24}{18}$ is $\frac{a}{3}$, then a = _____

d. $\frac{1}{7} \div 5 = $ _____

4. Martin spends $\frac{1}{3}$ of his money to buy food and $\frac{1}{2}$ of it to buy toys.
What fraction does the left money represent ?

Cumulative Assessment **14** **Till lesson (13) unit 9**

1. Complete the following.

a. If $\frac{4}{7} \times a = \frac{4}{7} + \frac{2}{7}$, then a = ‾‾‾‾‾

b. $5 \div \frac{1}{2} =$ ‾‾‾‾‾

c. If $3\frac{1}{2} \times 4 = (3 \times 4) + (b \times 4)$, then b = ‾‾‾‾‾

d. The number of thirds in 5 is ‾‾‾‾‾

e. $1\frac{1}{2} \times \frac{1}{3} =$ ‾‾‾‾‾

f. 2 hours and 15 minutes = ‾‾‾‾‾ minutes.

2. Choose the correct answer from these ones.

a. $\frac{1}{3} \div 5 =$ ‾‾‾‾‾

A. $\frac{5}{3}$ B. $\frac{3}{5}$ C. 15   D. $\frac{1}{15}$

b. The number of fifths in 4 is ‾‾‾‾‾

A. 9   B. 1   C. 20   D. $\frac{5}{4}$

c. $1\frac{1}{2}$ day = ‾‾‾‾‾ hours.

A. $\frac{3}{2}$ B. 24   C. 36   D. $\frac{2}{3}$

d. The LCM of the denominators of $\frac{3}{7}$ and $\frac{1}{3}$ is ‾‾‾‾‾

A. 10   B. 4   C. 21   D. $\frac{7}{3}$

e. The price of 7 pens is 36 pounds, then the price of each pen = ‾‾‾‾‾ pounds.

A. 43   B. 29   C. $7\frac{1}{5}$ D. $5\frac{1}{7}$

f. $2\frac{5}{6} = 1\frac{a}{6}$ by regrouping, then a = ‾‾‾‾‾

A. 5   B. 11   C. 6   D. 2

3. How many $\frac{1}{4}$ cup are there in 7 cups of chocolate?

4. For each problem, Identify which operation (addition, subtraction, multiplication or division), then answer the question.

a. $\frac{3}{4}$ of the teachers staff are male. How many of the staff are female?

b. Victor has 7 liters of mango juice. If he drinks $\frac{1}{4}$ Litre of juice each day. How many days will it take him to finish all the juice?

1. Complete the following.

a. The polygon which has six sides is called ――――

b. The quadrilateral which all sides are equal in length and all angles are equal in measure is called a ――――

c. The subcategory between the right-angled triangle and the rectangle is ――――

d. The LCM of denominators of $\frac{3}{4}$ and $\frac{1}{5}$ is ――――

e. The ―――― has only one pair of parallel sides.

f. $\frac{1}{2} \times \frac{8}{10} =$ ――――

2. Choose the correct answer from these ones.

a. The polygon which has four sides is called ――――

A. Triangle.   **B.** Hexagon.   **C.** Pentagon.   **D.** Quadrilateral.

b. Which of the subcategories could included the shapes ▢ and ◇ ?
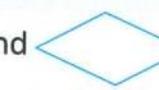
A. all sides are equal   **B.** all angles are equal

C. pair of parallel lines   **D.** Obtuse angles

c. $2\frac{1}{2} - 1\frac{3}{4} =$ ――――

A. $1\frac{1}{4}$ **B.** $1\frac{1}{2}$ **C.** $\frac{3}{4}$ **D.** $4\frac{1}{4}$

d. $2\frac{1}{4} \times 8 = (2 \times 8) + (\underline{\quad} \times 8)$

A. 18   **B.** $\frac{1}{4}$ **C.** 8   **D.** $\frac{1}{4} \times 8$

e. Berry is making a design of a quadrilateral with only four equal sides, she is making a ――――

A. Trapezoid.   **B.** Rhombus.   **C.** Rectangle.   **D.** Parallelogram.

3. Yasser ate $1\frac{1}{4}$ kg. of fruits, Mona ate $\frac{2}{5}$ kg. more than Yasser. Find what Yasser and Mona ate together.

――――――――――――――――――――――――――――

18

Cumulative Assessment **16** Till lesson (2) unit 10

1. **Choose the correct answer from these ones.**

   a. If $m(\angle X) = 40°$, $m(\angle Y) = 90°$ and $m(\angle Z) = 50°$, then the triangle is —————— – angled triangle.

   A. Acute   **B.** Right   **C.** Obtuse

   b. Any triangle has at least —————— acute angles.

   A. 2   **B.** 3   **C.** 4   **D.** 5

   c. The pentagon has —————— sides.

   A. 3   **B.** 4   **C.** 6   **D.** 5

   d. If $AB = BC = AC$, then the triangle ABC is —————— triangle.

   A. Equilateral   **B.** Isosceles   **C.** Scalene

   e. – = ——————
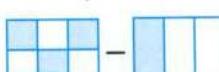
   A. $\frac{1}{3}$ **B.** $\frac{5}{6}$ **C.** $\frac{1}{6}$ **D.** 1

   f. The opposite number line represents ——————

   A. $6\frac{1}{2} + 4\frac{1}{2}$ **B.** $1 + \frac{1}{2} + \frac{1}{2}$

   C. $6\frac{1}{2} - 4\frac{1}{2}$ **D.** $\frac{1}{2} + 1 + \frac{1}{2}$
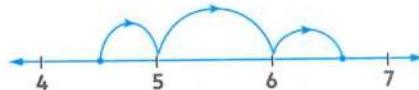
2. **Complete the following.**

   a. $\frac{1}{3} \div a = \frac{1}{6}$, then $a = $ ——————

   b. The right-angled triangle has two acute angles and —————— angle.

   c. The —————— is a parallelogram with 4 right angles.

   d. The rhombus with 4 right angles is called ——————

   e. $\frac{1}{3} - a = \frac{1}{6}$, then $a = $ ——————

   f. $3\frac{1}{2} + 2\frac{1}{3} = $ ——————   g. 40 minutes = —————— hour.

3. a. How many fourths in the number 3?

   b. Sohila likes chocolate. One day, she bought a chocolate and ate $\frac{1}{3}$ of it. Next day. she ate $\frac{1}{5}$ of it. Find the fraction of the left part.

4. Paula is making a design using a polygon that has two equal sides and the third side are different what shape is using?

Cumulative Assessment | **17** | **Till lessons (3 to 5) unit 10**

1. Complete the following.

a. The area of rectangle of dimensions $2\frac{3}{4}$ m and $3\frac{1}{2}$ m is ——————

b. $1 - \frac{\overline{}}{\underline{}} = \frac{1}{5}$

c. If the area of rectangle is $\frac{1}{3} \times a = \frac{2}{15}$, then a = ——————

d. $3\frac{1}{2} \times 1\frac{1}{3} =$ ——————

e. In the triangle ABC , m ($\angle$ A) = m ($\angle$ B) = 70° and m ($\angle$ C) = 40° , then the triangle is —————— angled triangle.

2. Choose the correct answer from these ones.

a. The opposite area model represents —————— .

A. $\frac{2}{3} \times \frac{1}{4}$ B. $\frac{1}{2} \times \frac{3}{4}$

C. $\frac{9}{12}$ D. $\frac{3}{12}$

b. $\frac{3}{7}$ m $\times \frac{1}{3}$ m = ——————

A. $\frac{3}{21}$ m   B. $\frac{1}{7}$ m^2 C. $\frac{4}{10}$ m^2 D. $\frac{1}{7}$ cm^2

c. 90 seconds = —————— minutes.

A. 90   B. $1\frac{1}{4}$ C. $1\frac{1}{2}$ D. $1\frac{1}{3}$

d. The triangle of side lengths are 5 cm , 6 cm , 7 cm is called —————— triangle.

A. Equilateral   B. Isosceles   C. Scalene

e. If $\frac{1}{2} + a = \frac{7}{8}$, then a = ——————

A. $\frac{6}{6}$ B. $\frac{3}{8}$ C. $\frac{8}{10}$ D. $1\frac{1}{8}$

3. Which is greater in area ?

A rectangle of length $2\frac{1}{2}$ cm and width $3\frac{1}{3}$ cm or another rectangle of dimensions $3\frac{1}{2}$ cm and $2\frac{1}{3}$ cm

4. A house has a door that is $1\frac{1}{2}$ m wide and $2\frac{1}{2}$ m long. What is the area of the door in square meters ?

Cumulative Assessment **18** **Till lessons (6 to 8) unit 10**

1. Plot the points on the coordinate grid.

A $(2,4)$, B $(2,7)$, C $(6,7)$

D $(6,4)$, then find :

a. The name of the figure ABCD ———— .

b. The area of the figure ABCD = ———— ☐ .

c. Write one of its attributes.
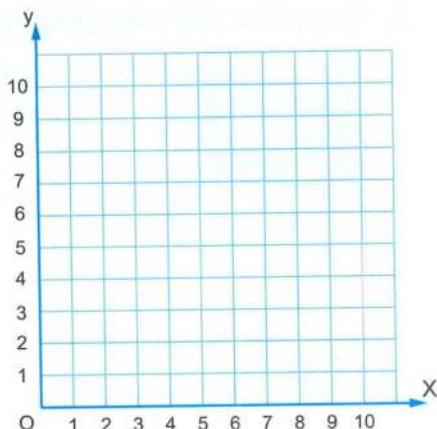
_____

2. Choose the correct answer from these ones.

a. Which of the following points located on y-axis ?

A. $(1,0)$ B. $(0,1)$ C. $(1,1)$ D. $(3,0)$

b. The subcategory between square and rectangle, they have ———— angles.

A. 4 Right   B. 4 Acute   C. 4 Obtuse

c. $\dfrac{3}{4} - \dfrac{5}{8} =$ ————— .

A. $\dfrac{1}{4}$ B. $\dfrac{1}{8}$ C. $\dfrac{3}{8}$ D. $\dfrac{5}{8}$

d. Which of the following is equal to $4 \times 2\dfrac{1}{2}$?

A. $8\dfrac{1}{2}$ B. 4 C. $\dfrac{10}{2}$ D. 10

3. Hassan is making a design using the grid. Starting from point A and match with point B.

Place the coordinate of point C to create an isosceles right-angled triangle at B.

1. Complete the following table and represent it on the coordinate grid.

X values	2	4	6	—	—	12
y values	5	6	—	8	—	10
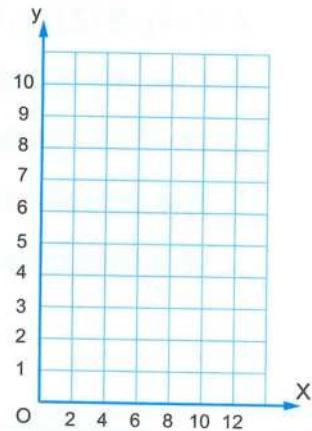
2. Choose the correct answer from these ones.

a. The points (1 , 3) , (5 , 11) and (3 , 7) can be represented in a table as _____

A.

X	3	7	8
y	1	3	11

B.

X	3	5	1
y	7	11	3

C.

X	3	5	3
y	1	11	7

D.

X	1	3	11
y	3	7	5

b. The triangle whose side lengths are _____ is an equilateral triangle.
   A. 7 cm , 6 cm , 5 cm   B. 5 cm , 7 cm , 5 cm
   C. 4 cm , 4 cm , 4 cm   D. 8 cm , 3 cm , 8 cm

c. If $5\frac{X}{12}$ is slightly greater than $5\frac{1}{2}$, then X may be equal to _____
   A. 7   B. 11   C. 9   D. 10

d. $6\frac{1}{2} =$ _____ $\div 2$
   A. 6   B. 11   C. 9   D. 13

3. Sophia sold $\frac{1}{7}$ of the items she had in her store on Monday and $\frac{2}{5}$ of the items on Wednesday. **How many of the items are left ? Give your answer as a fraction.**

Cumulative Assessment 20 Till lessons (10 & 11) unit 10

1. If the relation between perimeter of square and its side length as P = 4 × S where P is the perimeter of square and S is the side length. **Complete the following table.**

Side length S	1 cm	4 cm	___ cm	10 cm	6 cm
Perimeter P	4 cm	—	20 cm	—	—
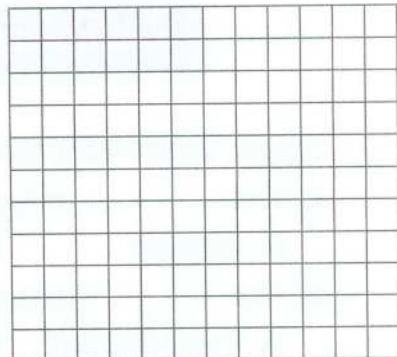
Then represent this table on the square net.

2. A car consumes two litres of petrol to cover a distance 20 km

a. Complete the following table.

Consumed petrol in litre	Convered distance in km
2	____
4	____
6	____
____	100
____	90
7	____

b. Graph the points on the grid.
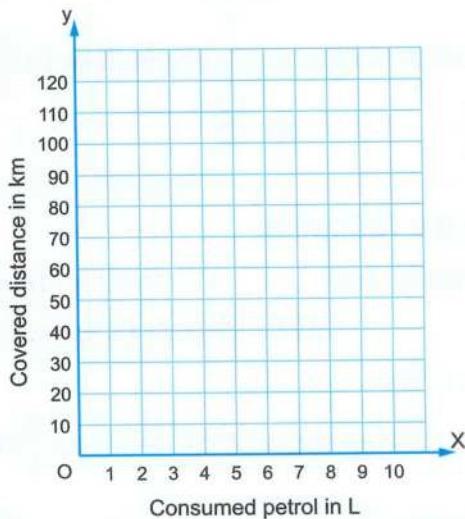
c. How many litre of petrol are needed to cover 120 km ?

3. **Complete the following.**

a. Simplest form of $\frac{16}{24}$ is _____

b. If $5 \div a = 10$, then a = _____

c. The polygon which has 5 sides is called _____

d. $\frac{2}{5} - \frac{1}{4} = $ _____

Cumulative Assessment | **21** Till lessons (1 & 2) unit 11

1. Choose the correct answer from these ones.

a. The ———— has no vertices , no edges and no flat faces.

   A. cylinder   B. cone   C. prism   D. sphere

b. The ———— has only one pair of parallel lines.

   A. Parallelogram   B. Trapezoid   C. Rhombus   D. Rectangle

c. The ———— has 5 sides.

   A. Triangle   B. Quadrilateral   C. Pentagon   D. Hexagon

d. The ———— has 12 edges , 8 vertices and 6 square faces.

   A. Cube   B. Rectangular prism   C. Square-base pyramid   D. Cylinder

e. If $\frac{4}{5} \times b = \frac{4}{5} + \frac{2}{5} + \frac{4}{5}$, then b = ————

   A. $\frac{4}{5}$ B. $\frac{1}{2}$ C. $1\frac{1}{2}$ D. $2\frac{1}{2}$

f. Which of the following is equivalent to $\frac{3}{7}$?

   A. $2\frac{1}{3}$ B. $\frac{13}{17}$ C. $\frac{9}{21}$ D. $\frac{6}{10}$

2. Complete the following.

a. The cylinder has ———— circular bases.

b. The ———— has 5 faces and 8 edges.

c. $\frac{4}{7} \times 6 = \frac{8}{7} \times$ ————

d. If $2\frac{1}{2} - k = \frac{3}{4}$, then k = ————

e. The area of rectangle of dimensions $\frac{3}{4}$ m and $1\frac{1}{3}$ m is ———— square m

f. The cuboid has ————

g. The number of vertices of cone is ————

3. Circle the solid figures that match the given data.

a. Shapes with 6 faces and 12 edges.

b. Shapes with 0 edges and 0 vertices.
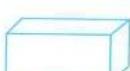
Cumulative Assessment **22** Till lessons (3 & 4) unit 11

1. **Complete using the opposite solid.**

   a. Number of horizontal layers is ———

   b. Number of cubes in each horizontal layer is ———

   c. Volume = ——— × ——— $= cm^3$

   d. The opposite solid is called ———
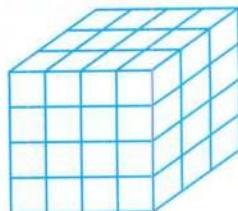
2. **Choose the correct answer from these ones.**

   a. A rectangular prism has 4 vertical layers and 8 cubes in each layer , then its volume = ——— cubes.

   A. $8-4$ B. $8+4$ C. $8 \div 4$ D. 8×4

   b. Volume of solid is formed from folding the opposite net square equals ———

   A. 12   B. 26

   C. 21   D. 7

   c. $\frac{3}{7} + \frac{2}{7} - \underline{\quad} = \frac{1}{7}$

   A. $\frac{6}{7}$ B. $\frac{2}{7}$ C. $\frac{4}{7}$ D. $\frac{1}{7}$

   d. $\frac{8}{11} \times 2.5 = \underline{\quad}$

   A. $\frac{16}{11}$ B. $1\frac{9}{11}$ C. $\frac{11}{20}$ D. $1\frac{2}{11}$
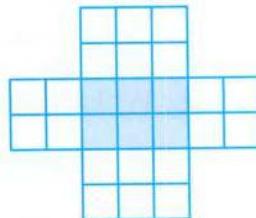
3. **Find the capacity of each of the following :**

   a.   1 cm

   b.   1 cm
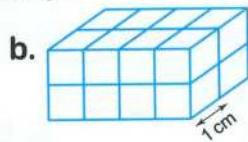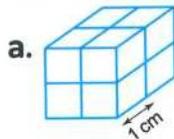
4. a. Youssef walked $1\frac{1}{2}$ km , Ahmed walked $\frac{1}{3}$ km more than Youssef. **How many km did Ahmed walk ?**

   b. If the price of 8 pencils is 60 pounds. **Find the price of each pencil.**

Cumulative Assessment **23** Till lessons (5 to 7) unit 11

1. Complete the following.

a. Volume of cuboid = base area × _____

b. If $\frac{24}{36} = \frac{2}{k}$, then k = _____

c. The equilateral triangle ABC has AB = BC = 5 cm , then AC = _____ cm

d. Volume of cuboid = 28 cm^3 and base area = 7 cm^2 then its height = _____ cm

e. A cuboid of length 6 cm , width 4 cm and height 3 cm , then its volume = _____ cm^3

f. $3\frac{2}{5} \times 2\frac{1}{2} = ($ _____ $+ \frac{2}{5}) \times (2 +$ _____ $)$

g. On the grid , the x-coordinate of (5 , 7) is _____

2. Choose the correct answer from these ones.

a. Which of the following is incorrect ?

A. $3\frac{3}{4} = 2\frac{7}{4}$ B. $2\frac{5}{8} = \frac{21}{8}$ C. $\frac{5}{3} = 1\frac{2}{3}$ D. $1\frac{3}{4} - 1\frac{1}{2} = 1\frac{1}{4}$

b. Which of the following is correct for the rectangular prism ?

A. volume = length × height

B. width = $\frac{\text{volume}}{\text{height}}$

C. length = $\frac{\text{base area}}{\text{volume}}$

D. height = $\frac{\text{volume}}{\text{base area}}$

c. $\frac{1}{6} \div 3$ ☐ $\frac{1}{6} - \frac{1}{9}$

A. <   B. >   C. =

d. A cuboid whose volume 60 cm^3 and its height 5 cm , then its base area = _____ cm^2

A. 300   B. 65   C. 55   D. 12

e. If $5 \div \frac{1}{4} = a \times 4$, then a = _____

A. 4   B. $\frac{1}{4}$ C. 5   D. $\frac{1}{5}$

f. If m ($\angle$ X) = 40° , m ($\angle$ Y) = 110° and m ($\angle$ Z) = 30° , then the triangle XYZ is _____ -angled triangle.

A. Acute   B. Right   C. Obtuse

3. Which of the following has the greatest volume ?

a.

b.
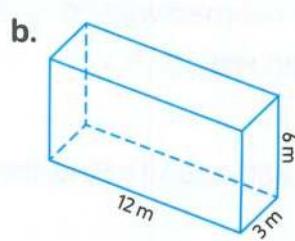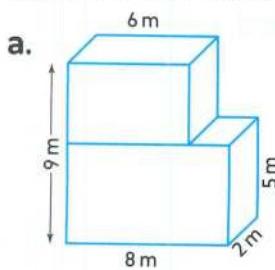
Cumulative Assessment **24** **Till lesson (8) unit 11**

1. Choose the correct answer from these ones.

a. The volume of cuboid of dimensions 17 cm , 13 cm and 11 cm equal ———— cm^3

    A. 2341   **B.** 2431   **C.** 2314   **D.** 2341

b. In $\triangle ABC$, if m $(\angle A) = 50°$, m $(\angle B) = 60°$ and m $(\angle C) = 70°$, then the triangle is ———— – angled triangle.

    A. Acute   **B.** Right   **C.** Obtuse

c. The two fractions $3\frac{2}{3}$ and $5\frac{1}{6}$ with like denominators are ————

    A. $3\frac{2}{3}$ and $5\frac{1}{6}$ **B.** $\frac{11}{3}$ and $\frac{31}{3}$ **C.** $3\frac{4}{6}$ and $5\frac{1}{6}$ **D.** $3\frac{2}{3}$ and $5\frac{2}{6}$

d. $12 \div 8 = 1\frac{1}{—}$

    A. 2   **B.** 3   **C.** 4   **D.** 5

2. A juice can is in the shape of cuboid , its base is square-shaped of side length 5 cm. and its height is 10 cm

Calculate the volume of juice can.

3. Which is greater in volume ? a cuboid of dimensions 70 cm , 50 cm and 30 cm or a cuboid whose base area = 2925 cm^2 and its height = 35 cm

4. A cuboid whose volume is 8000 cm^3 and the length of its base is 25 cm and the width of its base is 16 cm **Find the height of the cuboid.**

5. Draw a rectangle of dimensions $3\frac{1}{2}$ units and $2\frac{1}{2}$ units then find its area.

1. Complete the following.

a. In the opposite figure :

The fraction of the shaded

pie chart = _____
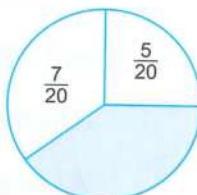
b. The measure of the central angle which represents $\frac{1}{4}$ of the circle is _____

c. $1 - \frac{5}{6} = $ _____

d. $\frac{1}{2}$ hour = _____ minutes.

e. $\frac{1}{2} \times 4 = $ _____

f. $\frac{1}{2} \div 4 = $ _____

2. The opposite figure shows the fractions

of time that Enas spends in studying

different subjects.
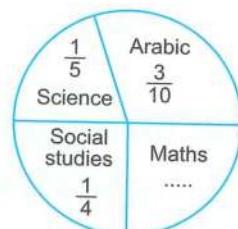
a. Find the fraction of the time that Enas spends

in studying social studies.

b. Find the fraction of the time that Enas spends in studying Maths.

c. Find the fraction of the time that Enas spends in studying Arabic.

d. If the total time that Enas studies is 8 hours. Find the time of Maths in hours.

3. This table shows the distribution of 100 students according to the subject they prefer :

Subject	Maths	English	Arts	Science
Number of pupils	——	25	——	15
fraction	$\frac{1}{2}$	——	$\frac{1}{10}$	——
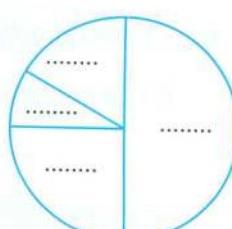
a. Complete the table.

b. Represent it in the opposite pie chart.

Monthly Tests

March Tests Till lesson **8** unit **9**

Test **1**

Total mark
15

1. Choose the correct answer. (5 marks)

1. The mixed number $4\frac{1}{3}$ can be regrouped as ———

   A. $\frac{13}{4}$ B. $3\frac{1}{4}$ C. $3\frac{4}{3}$ D. $4+\frac{1}{3}$

2. If $\frac{5}{8}=\frac{x}{40}$, then $x=$ ———

   A. 37   B. 25   C. 40   D. 5×8

3. $4\times 5+\frac{4}{5}\times 5=$ ——— $\times 5$

   A. $\frac{24}{5}$ B. 4   C. $\frac{4}{5}$ D. $5\frac{4}{5}$

4. $2\frac{1}{4}-1\frac{1}{2}=$ ———

   A. $1\frac{1}{4}$ B. $\frac{3}{4}$ C. $3\frac{3}{4}$ D. $1\frac{1}{2}$

5. If $3\frac{5}{m}$ is about 4, then m may be ———

   A. 6   B. 8   C. 10   D. 12

2. Complete the following. (5 marks)

1. $\frac{1}{4}$ hour = ——— minutes.

2. The simplest form of $\frac{12}{18}$ is ———

3. $3\frac{3}{4}\times 1\frac{1}{3}=$ ———

4. If $1\frac{1}{5}+x=5$, then $x=$ ———

5. $\frac{5}{6}+\frac{11}{10}$ is estimated as ——— + ——— = ———

3. a. Adel studied Mathematics for $1\frac{1}{3}$ hour and English for 50 minutes. How many minutes did Adel study in all? (2 marks)

———————————————————

———————————————————

b. Use the area models to evaluate each of the following. (3 marks)

1. $\frac{1}{3}\times\frac{1}{4}$ 2. $1\frac{1}{2}\times 2\frac{1}{4}$

———————————————————

———————————————————

Total mark
15

Test 2

1. Choose the correct answer. (5 marks)

1. The fraction $\frac{10}{15}$ is equivalent to ——————

   A. $\frac{4}{6}$ B. $\frac{2}{5}$ C. $1\frac{1}{2}$ D. $\frac{20}{33}$

2. Which of the following is overestimate ?

   A. $\frac{3}{5} + \frac{4}{7}$ is about 1   B. $2\frac{1}{5} + \frac{8}{7}$ is about 3

   C. $\frac{5}{8} + \frac{4}{7}$ is about 1   D. $\frac{6}{7} + 5\frac{4}{5}$ is about 7

3. The opposite model area represents ——————

   A. $\frac{4}{3} \times \frac{1}{3}$ B. $1\frac{1}{3} \times 2$ C. $2 \times \frac{1}{3} \times \frac{1}{3}$ D. $2 + \frac{1}{3}$

1	$\frac{1}{3}$
1	$\frac{1}{3}$

4. $1\frac{5}{6} \times \frac{5}{6}$ is —————— $1\frac{5}{6}$

   A. less than   B. equal to   C. greater than

5. If $\frac{8}{9} \times b = \frac{8}{9} + \frac{4}{9}$, then b = ——————

   A. $\frac{8}{9}$ B. $\frac{4}{9}$ C. $\frac{1}{2}$ D. $1\frac{1}{2}$

2. Complete the following. (5 marks)

1. $3\frac{7}{8} + \frac{1}{4} = 4 +$ ——————   2. 60 hours = —————— days.

3. If $x + 5\frac{5}{6} = 9\frac{1}{12}$, then $x =$ ——————

4. The LCM of the denominators of the fractions $\frac{1}{3}$ and $\frac{5}{12}$ is ——————

5. $5 - \frac{1}{2} - \frac{1}{3} =$ ——————

3. a. Use the number line to find the difference. (2 marks)

   1. $4\frac{1}{3} - 1\frac{1}{2}$ 2. $6\frac{4}{5} - 4\frac{1}{4}$

   ————————————————————————

   ————————————————————————

   b. Marwan ate $\frac{3}{4}$ pieces of chocolate. His friend Wael ate $1\frac{1}{2}$ pieces more than him. How many pieces did they eat together ? (3 marks)

   ————————————————————————

   ————————————————————————

31

From lesson **9** unit **9** – To lesson **11** unit **10**

Total mark

15

Test 1

1. Choose the correct answer. (5 marks)

1. If m $(\angle X) = 40°$, m $(\angle Y) = 90°$ and m $(\angle Z) = 50°$, then the triangle is _____ angled triangle.

   A. acute   **B.** right   **C.** obtuse

2. If $\frac{1}{3} \div a = \frac{1}{6}$, then a = _____

   A. 3   **B.** $\frac{1}{2}$ **C.** 2   **D.** $\frac{1}{3}$

3. $\frac{3}{7} m \times \frac{1}{3} m = $ _____

   A. $\frac{3}{21}$ m   **B.** $\frac{1}{7}$ m²   **C.** $\frac{4}{10}$ m²   **D.** $\frac{1}{7}$ cm²

4. 5 bales of cotton shared by 3 manufacturers represented by _____

   A. $3 \div 5$ **B.** $3 + 5$ **C.** $5 - 3$ **D.** $5 \div 3$

5. The parallelogram with 4 right angles is called _____

   A. square   **B.** rectangle   **C.** rhombus   **D.** trapezium

2. Complete the following. (5 marks)

1. The polygon which has six sides is called _____

2. The x-coordinate of the point (1 , 4) is _____   3. $4 \div \frac{1}{7} = $ _____

4. If the price of 7 pens is 59 L.E. , then the price of each pen = _____ L.E.

5. If $12 \div 8 = 1\frac{1}{x}$, then $x = $ _____

3. a. A house has a door that is $1\frac{1}{2}$ m wide and $2\frac{1}{2}$ m long. What is the area of the door in square meters ? (2 marks)

_____

_____

b. Khaled is making a design using the grid. Starting from point A and match with point B. Place the coordinates of point C to create an isosceles right-angled triangle at A (3 marks)

Total mark

15
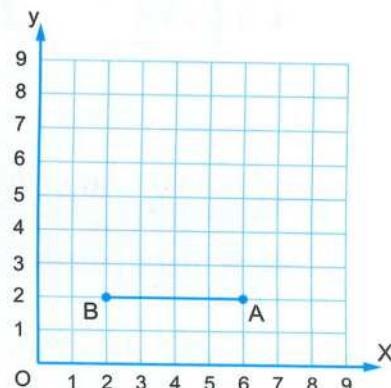
Test 2

1. Choose the correct answer.

(5 marks)

1. The ——— is a rhombus with 4 right angles.

   A. parallelogram   B. rectangle   C. trapezium   D. square

2. The triangle whose side lengths are ——— is an equilateral triangle.

   A. 7 cm , 6 cm , 5 cm   B. 5 cm , 7 cm , 5 cm

   C. 4 cm , 4 cm , 4 cm   D. 8 cm , 8 cm , 3 cm

3. If $5 \div \frac{1}{3} = x$, then $x =$ ———

   A. 15   B. $\frac{5}{3}$ C. $\frac{3}{5}$ D. 8

4. $6\frac{1}{2} =$ ——— $\div 2$

   A. 6   B. 11   C. 9   D. 13

5. The ——— is called the origin point.

   A. (1 , 0)   B. (0 , 1)   C. (1 , 1)   D. (0 , 0)

2. Complete the following.

(5 marks)

1. The area of rectangle = ——— × ———

2. If $5 \div a = 10$, then $a =$ ———

3. The opposite triangle is called ——— triangle.

4. The opposite figure represents ———

5. The subcategory between square and rectangle
   , they have ——— angles.

6 cm   5 cm   7 cm

| $\frac{1}{2}$ | | | $\frac{1}{2}$ | | |
| $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ | $\frac{1}{6}$ |
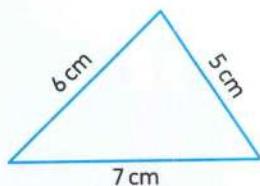
3. a. How many sevenths are in the number 5 ?

(2 marks)

———————————————————

———————————————————

b. In the opposite coordinate plane :

(3 marks)

1. Graph the figure ABCD where
   A (2 , 8) , B (3 , 4) , C (8 , 4)
   and D (7 , 8)

2. What is the length of $\overline{AD}$?
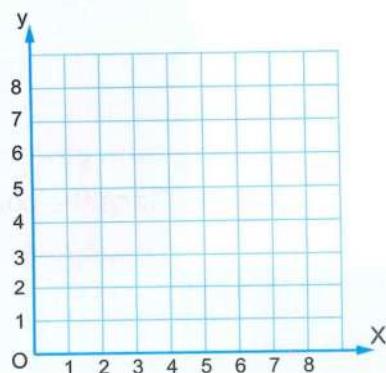
Final Assessments

Model 1

1. Choose the correct answer.

a. If $\frac{6}{17} \times b = \frac{6}{17} + \frac{3}{17}$, then b = _____

    A. 1   **B.** $\frac{1}{2}$ **C.** $1\frac{1}{2}$ **D.** $\frac{3}{17}$

b. The _____ has one vertex.

    A. cube   **B.** cuboid   **C.** cone   **D.** cylinder

c. If $7\frac{a}{8}$ is a little greater than $7\frac{1}{2}$, then a may be _____

    A. 4   **B.** 5   **C.** 7   **D.** 8

d. In $\triangle ABC$, m $(\angle A) = 50°$, m $(\angle B) = 60°$ and m $(\angle C) = 70°$, then the triangle is _____ angled triangle.

    A. acute   **B.** right   **C.** obtuse

e. $4 \div \frac{1}{2} =$ _____

    A. 6   **B.** 2   **C.** 8   **D.** $4\frac{1}{2}$

f. Which of the following is underestimate ?

    A. $\frac{4}{7} + \frac{5}{8}$ is about 1   **B.** $\frac{3}{7} + \frac{4}{10}$ is about 1

    C. $\frac{4}{5} + \frac{7}{8}$ is about 2   **D.** $\frac{6}{7} + \frac{5}{6}$ is about 2

g. The area of rectangle whose dimensions are $\frac{1}{3}$ m and $\frac{1}{4}$ m is _____

    A. $\frac{1}{12}$ m²   **B.** $\frac{3}{4}$ m²   **C.** $\frac{1}{12}$ cm²   **D.** $\frac{1}{12}$ m

2. Complete the following.

a. The parallelogram with 4 right angles is called _____

b. $2\frac{1}{2} \times 5 = [2 \times 5] + [$ _____ $\times 5]$

c. 2 hours = _____ minutes.

d. $1 -$ _____ $= \frac{3}{4}$

e. The X-coordinate of $(2 , 5)$ is _____

f. In the equilateral triangle LMN , LM = MN = 5 cm , then LN = _____ cm

g. $2\frac{3}{5} +$ _____ $= 3\frac{1}{2}$

h. $\frac{3}{8} \times$ _____ $= \frac{3}{7}$

3. Choose the correct answer.

a. A cuboid has 2 vertical slices and each slices has 5 cm³ , then it's volume = —————— cm³

   A. 7   B. 10   C. 3   D. $\frac{5}{2}$

b. $\frac{3}{5} \times \frac{5}{3}$ is —————— $\frac{3}{5}$

   A. less than   B. greater than   C. equal to

c. If $12 \div 7 = 1\frac{a}{7}$, then a = ——————

   A. 2   B. 7   C. 5   D. 12

d. The fraction $2\frac{1}{4}$ by regrouping is ——————

   A. $2\frac{5}{4}$ B. $\frac{9}{2}$ C. $1\frac{5}{4}$ D. $\frac{5}{4}$

e. 150 minutes = —————— hours and —————— minutes.

   A. 1 , 30   B. 1 , 50   C. 3 , 30   D. 2 , 30

f. Volume of solid is formed from folding the net square ⬚ is —————— cube units.

   A. 3 × 2

   C. 3 − 2
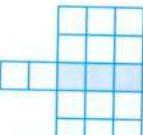
   B. 3 + 2

   D. 3 ÷ 2

g. $\frac{5}{3} \times \frac{4}{7}$ is —————— $\frac{5}{3}$

   A. less than   B. greater than   C. equal to

---

4. Answer the following.

a. Ahmed ate $1\frac{3}{4}$ kg of fruits , Bassem ate $\frac{1}{5}$ kg more than Ahmed and Wael ate $\frac{2}{5}$ kg less than Ahmed.

   How many kg of fruits did the three friends eat together ?

   _____

b. Use the number line to answer the questions.
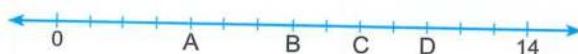
   1. What is the value of C ?   2. What is the value of D ?
   3. What is the value of A ?   4. How far is point B from D ?
   5. How far is point C from A ?

   _____

c. **In the opposite solid.**

1. Number of horizontal layers : ―――――

2. Number of cubes in each horizontal layer : ―――――

3. Volume = ――――― × ――――― = ――――― cm^3
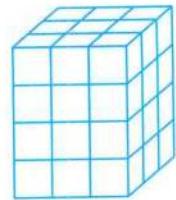
d. **The opposite figure shows the favourite hobbies for the pupils of one of the classes in the fifth primary, study the figure, then answer.**

What is the fraction of the rangers with respect to all hobbies ?

(Pie chart: School broadcast $\frac{1}{5}$, Theatre $\frac{1}{4}$, School press $\frac{1}{5}$, Rangers ―――, Music $\frac{1}{5}$)
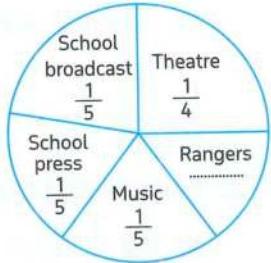
Model 2

1. Choose the correct answer.

a. $\frac{3}{4} \times \frac{12}{150}$ is ――――― $\frac{3}{4}$

    A. less than   **B.** greater than   **C.** equal to

b. $3\frac{1}{2} - 1\frac{2}{3} = $ ―――――

    A. $1\frac{5}{6}$ **B.** $6\frac{1}{5}$ **C.** $5\frac{1}{6}$ **D.** $1\frac{6}{5}$

c. $2\frac{1}{3} \times \frac{3}{7} = $ ―――――

    A. $\frac{4}{4}$ **B.** $\frac{3}{7}$ **C.** $2\frac{1}{7}$ **D.** $\frac{7}{3}$

d. $\frac{3}{7} + \frac{2}{7} - $ ――――― $= \frac{1}{7}$

    A. $\frac{6}{7}$ **B.** $\frac{2}{7}$ **C.** $\frac{1}{7}$ **D.** $\frac{4}{7}$

e. Area of rectangle = ―――――

    A. L + W   **B.** L × W   **C.** L ÷ W   **D.** [L + W] × 2

f. $\frac{1}{2} \div 6 = $ ―――――

    A. 3   **B.** $\frac{1}{12}$ **C.** $\frac{2}{6}$ **D.** $\frac{1}{8}$

g. *(figure)* has ――――― *(cube)*

    A. 3   **B.** 4   **C.** 5   **D.** 6

2. Complete the following.

a. Volume of cuboid = ――――― × ――――― × ―――――

b. ――――― $+ 1\frac{5}{7} = 3\frac{5}{14}$

c. The polygon which has 5 sides is called ―――――

d. $0.25 \times \dfrac{8}{9} = $ _____

e. By using the number line : $9\dfrac{1}{3} - 7\dfrac{1}{2} = $ _____

f. $1 - \dfrac{1}{2} - \dfrac{1}{3} = $ _____

g. The parallelogram with 4 equal sides is called _____

h. If $\dfrac{2}{5} \times 3\dfrac{1}{2} = \dfrac{2}{5} \times 3 + \dfrac{2}{5} \times b$, then $b = $ _____

---

3. Choose the correct answer.

a. If $2\dfrac{3}{5} + X = 3$, then $X = $ _____

  A. $\dfrac{5}{3}$ **B.** $\dfrac{13}{5}$ **C.** $2 + \dfrac{3}{5}$ **D.** $\dfrac{2}{5}$

b. If $4\dfrac{b}{7}$ is almost 4 , then b may be _____

  A. 1   **B.** 4   **C.** 5   **D.** 6

c. $+$ $= $ _____

  A. $\dfrac{1}{3} + \dfrac{1}{3}$ **B.** $\dfrac{1}{2} + \dfrac{1}{2}$ **C.** $\dfrac{1}{2} + \dfrac{1}{3}$ **D.** $3 + 2$

d. In the triangle ABC , AB $=$ BC $= 5$ cm. , AC $= 3$ cm. , then the triangle is _____

  A. equilateral.   **B.** isosceles.   **C.** scalene.

e. The two like denominator fractions represent the models are _____

  A. $\dfrac{3}{4} , \dfrac{1}{3}$ **B.** $\dfrac{6}{8} , \dfrac{2}{8}$ **C.** $\dfrac{8}{12} , \dfrac{4}{12}$ **D.** $\dfrac{9}{12} , \dfrac{4}{12}$

f. The fraction $\dfrac{3}{7}$ is equivalent to _____

  A. $\dfrac{13}{17}$ **B.** $\dfrac{15}{21}$ **C.** $\dfrac{31}{71}$ **D.** $\dfrac{6}{14}$

g. If Ahmed bought 7 kg of meat and wanted to divide it into 5 meals , then the number of kg in each meal $= $ _____ kg

  A. 7×5 **B.** $5 \div 7$ **C.** $1\dfrac{2}{5}$ **D.** $7 - 5$

---

4. Answer the following.

a. How many sixths are in the number 10 ?

b. What is the volume of the solid formed from folding the opposite net square ?
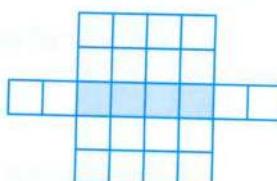
c. Marwan studied math for $2\frac{1}{2}$ hours and science for 90 minutes.

How many hours did Marwan study in all ?

_____

_____

d. A car consumes one liter of petrol to cover a distance 10 km, complete the following table and then graph the points on the grid.

1.

Consumed petrol in litre	Covered distance in Km
2	_____
3	_____
4	_____
_____	60
_____	50
7	_____

2.

Covered distance in km — Consumed petrol in L
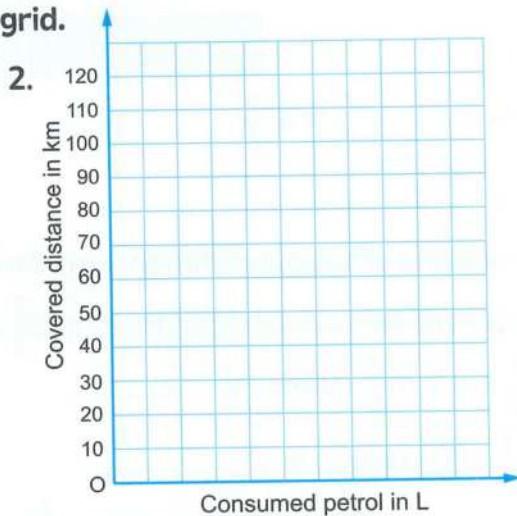
Model 3

1. Choose the correct answer.

a. If $8 \div m = 24$, then $m =$ _____

　A. 3　　　　　**B.** $\frac{1}{3}$　　　　　**C.** $1\frac{1}{3}$　　　　　**D.** 32

b. Which of the following is correct ?

　A. $\frac{3}{2} = \frac{4}{6}$　　　**B.** $\frac{7}{8} = \frac{5}{6}$　　　**C.** $\frac{7}{14} = \frac{1}{2}$　　　**D.** $\frac{3}{2} = \frac{9}{5}$

c. Volume of opposite solid is _____ cm^3

　A. 4　　　　　**B.** 20

　C. 12　　　　　**D.** 64

Area = 16cm²　　4 cm

d. $\frac{3}{7} \times 8 =$ _____

　A. $\frac{8}{3} \times 7$　　　**B.** $\frac{6}{7} \times 4$　　　**C.** $\frac{5}{7} \times 6$　　　**D.** $\frac{24}{8} \times 7$

e. Which of the following points located on y-axis ?

　A. $(1,0)$　　　**B.** $(0,1)$　　　**C.** $(1,1)$　　　**D.** $(7,0)$

f. $3\frac{1}{2} + 2\frac{1}{3} =$ _____

　A. $5\frac{5}{6}$　　　**B.** $5\frac{2}{5}$　　　**C.** $\frac{6}{2} + \frac{6}{3}$　　　**D.** $\frac{7}{2} + 3\frac{1}{2}$

39
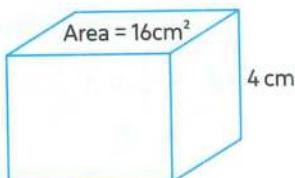
g. If $2\frac{8}{d}$ is nearly $2\frac{1}{2}$, then d may be _____

   A. 32   **B.** 5   **C.** 7   **D.** 17

2. Complete the following.

a. Use area models to subtract : $2\frac{5}{6} - 1\frac{2}{3} =$ _____

b. $6\frac{2}{3} -$ _____ $= 4\frac{1}{2}$

c. $2\frac{3}{4} \times 1\frac{1}{3} =$ _____

d. The volume of cuboid of dimensions 2 m , 5 m and 6 m is _____ m³

e. The LCM of denominators of fractions $\frac{2}{3}$ and $\frac{1}{5}$ is _____

f. If $2\frac{1}{2} + a = 3\frac{1}{4}$, then $a =$ _____

g. If $2\frac{1}{7} = \frac{x}{7}$, then $x =$ _____

h. The area of rectangle of dimensions $\frac{1}{3}$ m and $\frac{1}{5}$ m is _____

3. Choose the correct answer.

a. $\frac{4}{7} \times \frac{14}{8}$ is _____ $\frac{4}{7}$

   A. less than   **B.** greater than   **C.** equal to

b. In $\triangle ABC$, $m(\angle A) = 130°$ and $m(\angle B) = m(\angle C) = 25°$, then the triangle is _____ angled triangle.

   A. acute   **B.** right   **C.** obtuse

c. The _____ is a rectangle with 4 equal sides.

   A. parallelogram   **B.** trapezium   **C.** square   **D.** rhombus

d. $5\frac{1}{7} \times 3\frac{1}{4} = [5 + \frac{1}{7}] \times [$ _____ $+ \frac{1}{4}]$

   A. 15   **B.** 8   **C.** 3   **D.** 1

e. If $a \times \frac{3}{17} = \frac{2}{17}$, then $a =$ _____

   A. $\frac{2}{3}$ **B.** $\frac{3}{2}$ **C.** $\frac{1}{17}$ **D.** $\frac{5}{17}$

f. The _____ has a pair of parallel sides.

   A. trapezium   **B.** square   **C.** rhombus   **D.** rectangle

g. has _____

   A. 4   **B.** 7   **C.** 11   **D.** 12

4. Answer the following.

a. Youssef spent $\frac{3}{4}$ of an hour biking and $\frac{5}{6}$ of an hour jogging.
Afterwards , he swam for $\frac{1}{8}$ of an hour.
How much time did Youssef exercise before he went swimming in minutes ?

_____

b. The following table shows the rate of the score of 200 students
in one school of Cairo governorate :

Rate	Excellent	Good	Pass	Weak
Fraction	$\frac{3}{20}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{10}$

Represent these data by the opposite pie chart.

_____

c. If the price of 9 pens is 77 L.E. **Find the price of each pen.**

_____

d. Look at the table and fill in the missing y values based on the pattern of plant height in
Haitham's garden from one week to the next.

Weeks , X	1	2	3	4	5	6
Height of plants , y	$\frac{1}{2}$ cm	2 cm	$3\frac{1}{2}$ cm	___	___	___

Graph the coordinate points from the table.
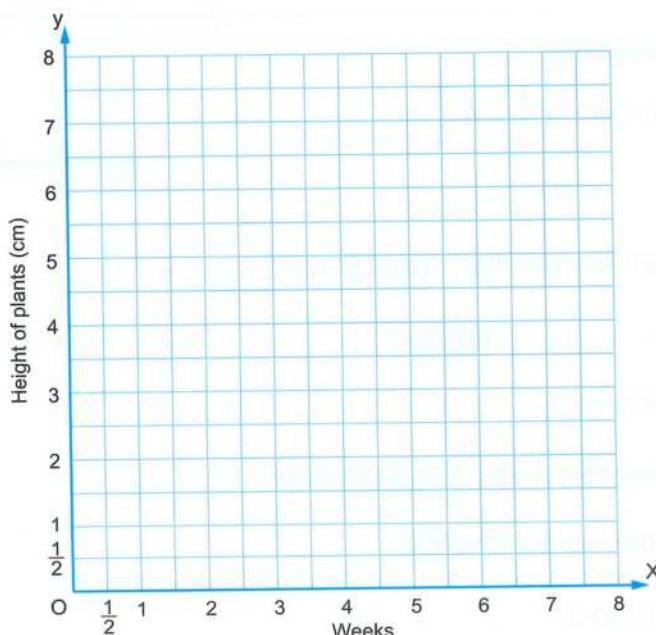
Model 4

1. Choose the correct answer.

a. The square pyramid has —————— triangle faces.

    A. 4   **B.** 5   **C.** 7   **D.** 8

b. The smallest common denominator of $\frac{2}{3}$ and $\frac{2}{5}$ is ——————

    A. 2   **B.** 15   **C.** 30   **D.** 35

c. If $3\frac{x}{29}$ is about 4 , then x may be ——————

    A. 13   **B.** 2   **C.** 7   **D.** 28

d. The —————— is a rhombus of 4 right angles.

    A. quadrilateral   **B.** parallelogram   **C.** rectangle   **D.** square

e. $2\frac{1}{7}+5\frac{1}{2}=$ ——————

    A. $7\frac{2}{9}$ **B.** $3\frac{9}{14}$ **C.** $7\frac{9}{14}$ **D.** $1\frac{1}{7}$

f. $3-2\frac{1}{2}=$ ——————

    A. $\frac{1}{2}$ **B.** $1\frac{1}{2}$ **C.** 1   **D.** $1\frac{1}{3}$

g. $\frac{1}{5}\div 4=$ ——————

    A. $\frac{4}{5}$ **B.** $\frac{5}{4}$ **C.** 20   **D.** $\frac{1}{20}$

2. Complete the following.

a. Use a number line : $6\frac{1}{5}-4\frac{3}{4}=$ ——————

b. $7\frac{3}{8}+$ —————— $=9\frac{1}{4}$

c. The equilateral triangle ABC has AB $=$ BC $=$ ——————

d. The cube has —————— edges.

e. If $\frac{3}{4}=\frac{a}{16}$, then a $=$ ——————

f. By using the benchmarks , $\frac{5}{6}$ is estimate as ——————

g. —————— $=$ base area $\times$ height

h. If $\frac{1}{2}+a=\frac{5}{6}$, then a $=$ ——————
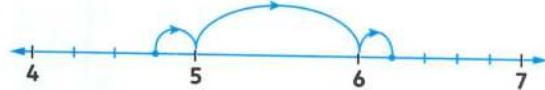
3. Choose the correct answer.

a. $16 \div 7 = 2\dfrac{2}{\underline{\quad}}$.

    A. 7   **B.** 14   **C.** 16   **D.** 4

b. The cylinder has ———— bases.

    A. zero   **B.** 1   **C.** 2   **D.** 3

c. $\dfrac{3}{7} \times \dfrac{5}{5}$ is ———— $\dfrac{3}{7}$

    A. greater than   **B.** less than   **C.** equal to

d. If $5 - a = 4\dfrac{1}{3}$, then a = ————

    A. $\dfrac{1}{3}$ **B.** $\dfrac{2}{3}$ **C.** $4\dfrac{1}{3}$ **D.** $4\dfrac{2}{3}$

e. Area of rectangle with length $2\dfrac{1}{2}$ length units and width $1\dfrac{1}{5}$ length units is ————
square units.

    A. 2   **B.** 3   **C.** $3\dfrac{7}{10}$ **D.** $1\dfrac{3}{10}$

f. The number of thirds in one is ————

    A. 1   **B.** 2   **C.** 3   **D.** $\dfrac{1}{3}$

g. A cuboid has 4 horizontal layers and 5 cube units in each layer,
then its volume = ———— cube units.

    A. 9   **B.** $\dfrac{5}{4}$ **C.** $\dfrac{4}{5}$ **D.** 20

---

4. Answer the following.

a. In the opposite circle :

    1. Shade in $\dfrac{1}{2}$ of the circle blue

    , $\dfrac{1}{4}$ of the circle yellow

    , $\dfrac{1}{8}$ of the circle green

    , $\dfrac{1}{8}$ of the circle purple.
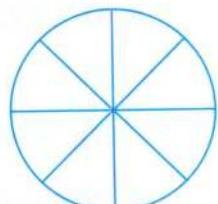
    2. If this pie chart represents 100 students surveyed how many students of the yellow
section represent ?

b. Karim walked $2\dfrac{1}{5}$ km and Sameh walked $1\dfrac{1}{3}$ km more.
What distance that Sameh walked ?

c. **In the opposite solid :**

1. Number of vertical slices : _____

2. Number of cubes in each vertical slice : _____

3. Volume = _____ × _____ = _____ cm³
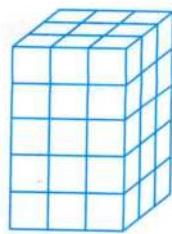
d. **In the following grid , observe and answer.**

Write the ordered pair of each of the following points :

1. W _____   2. Y _____   3. N _____

4. F _____   5. C _____   6. X _____

7. K _____   8. U _____   9. I _____
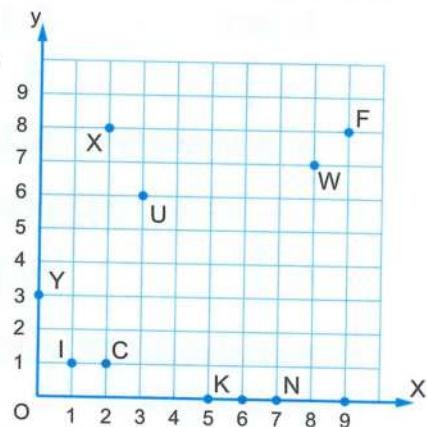
Model   5

1. Choose the correct answer.

a. The polygon which has four sides is called _____

    A. triangle.   **B.** quadrilateral.   **C.** pentagon.   **D.** hexagon.

b. $\dfrac{3}{4} + \dfrac{1}{2} =$ _____

    A. $\dfrac{4}{6}$ **B.** $\dfrac{3}{8}$ **C.** $\dfrac{1}{4}$ **D.** $1\dfrac{1}{4}$

c. In $\triangle XYZ$, $m(\angle X) = 90°$, $m(\angle Y) = 40°$ and $m(\angle Z) = 50°$, then the triangle is _____ angled triangle.

    A. acute   **B.** right   **C.** obtuse

d. The y-coordinate of $(0 , 7)$ is _____

    A. 0   **B.** 7   **C.** 70   **D.** 1

e. The sphere has _____ vertices.

    A. 0   **B.** 1   **C.** 2   **D.** 3

f. Area of rectangle = _____ × w.

    A. l   **B.** w   **C.** h   **D.** base area

g. If $\dfrac{7}{8} \times 12 = \dfrac{14}{8} \times x$, then $x =$ _____

    A. 7   **B.** 12   **C.** 8   **D.** 6

2. Complete the following.

   a. Height of cuboid = _____ ÷ _____

   b. The LCM of the denominators of fraction $\frac{1}{3}$ and $\frac{2}{7}$ is _____

   c. If $\frac{1}{2} \times b = \frac{5}{6}$, then b = _____   **d.** $5\frac{2}{5} -$ _____ $= 3\frac{1}{3}$

   e. $1\frac{3}{7} \times$ _____ $= 1$ **f.** $\frac{1}{7} \div 4 =$ _____

   g. The area of rectangle of dimensions $\frac{1}{3}$ length units and $\frac{1}{4}$ length unit is _____

   h. The shape which has 0 faces, 0 edges and 0 vertices is _____

3. Choose the correct answer.

   a. Which of the following is overestimate ?

      A. $\frac{3}{4} + \frac{3}{7}$ is about 1   **B.** $\frac{11}{20} + \frac{3}{5}$ is about 1

      C. $\frac{7}{8} + \frac{2}{5}$ is about $1\frac{1}{2}$ **D.** $1\frac{1}{6} + \frac{5}{8}$ is about $1\frac{1}{2}$

   b. The origin point is _____

      A. (1,0)   **B.** (0,1)   **C.** (0,0)   **D.** (1,1)

   c. $5\frac{1}{6} + 2\frac{4}{5}$ is estimate as _____

      A. 5 + 3   **B.** 6 + 3   **C.** 5 + 2   **D.** 6 + 4

   d. + = _____

      A. $\frac{2}{3}$ **B.** $\frac{3}{4}$ **C.** 1   **D.** $\frac{5}{6}$

   e. If $2\frac{3}{4} \times 1\frac{1}{2} = (2 \times 1) + (b \times \frac{1}{2}) + \frac{3}{4} + \frac{3}{4} \times \frac{1}{2}$, then b = _____

      A. 2   **B.** $\frac{3}{4}$ **C.** 1   **D.** $\frac{1}{2}$

   f. If $4\frac{k}{23}$ is about $4\frac{1}{2}$, then k may be = _____

      A. 2   **B.** 3   **C.** 4   **D.** 11

   g. The value of the missing numbers in the table are = _____

X- values	2	3	4	5	6
y- values	4	8	12	—	—

      A. 16,19   **B.** 16,20

      C. 15,19   **D.** 15,20

4. Answer the following.

a. Islam spent $\frac{1}{4}$ of his Sunday doing homework and $\frac{1}{10}$ of the day watching cricket. What part of the day was left to do other things ?

_____

b. How many thirds are in the number 7 ?

_____

c. Use the number line to answer the questions.

1. What is the value of A ?

2. What is the value of B ?

3. What is the value of C ?

4. How far is point C from point A ?

5. How far is point B from point A ?

d. Complete the table and represent it.

X- values	0	5	10	15	20	25	30	35
y- values	45	40	35	—	—	—	—	—
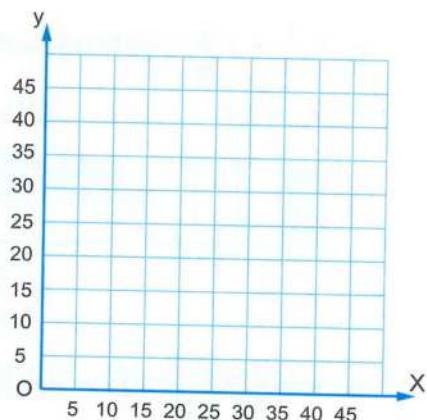
Model 6

1. Choose the correct answer.

a. If $5\frac{20}{y}$ is a little less than 6 , then y may be _____

    A. 21   **B.** 5   **C.** 2   **D.** 39

b. The cube has _____ faces.

    A. 4   **B.** 6   **C.** 8   **D.** 12

c. The simplest form of $\frac{36}{48}$ is —————

   A. $\frac{6}{8}$ B. $\frac{3}{2}$ C. $\frac{2}{3}$ D. $\frac{3}{4}$

d. The ————— is a polygon with 6 sides.

   A. quadrilateral   B. pentagon   C. hexagon   D. square

e. Which of the following is underestimate ?

   A. $6\frac{7}{8}+\frac{5}{6}=8$ B. $\frac{1}{3}+1\frac{1}{10}=1$ C. $\frac{3}{10}+\frac{7}{9}=1\frac{1}{2}$ D. $5\frac{8}{9}+\frac{8}{7}=6$

f. $1-\frac{3}{4}=$ —————

   A. $\frac{1}{4}$ B. $\frac{2}{4}$ C. $\frac{3}{4}$ D. $\frac{4}{4}$

g. How many fifths are there in 7 ?

   A. $5\div7$ B. 5×7 C. $5+7$ D. $7-5$

---

2. Complete the following.

a. $7\frac{3}{8}+$ ————— $=10\frac{1}{4}$

b. $\frac{1}{5}+\frac{3}{4}=$ —————

c. $\frac{10}{3}\times\frac{3}{10}=$ —————

d. If $2\frac{1}{4}\times8=\left(\frac{1}{4}\times b\right)+(2\times8)$, then $b=$ —————

e. $\frac{1}{2}\times\frac{3}{5}=$ —————

f. In $\triangle ABC$, $AB=BC=7$ cm and $AC=4$ cm, then the triangle is —————

g. Volume of cuboid = ————— × height.

h. If $\frac{1}{3}\div a=\frac{1}{9}$, then $a=$ —————

---

3. Choose the correct answer.

a. The area of rectangle of dimensions $5\frac{1}{2}$ meters and $2\frac{1}{2}$ meters is —————

   A. $13\frac{3}{4}$ m   B. 8 m   C. 8 m²   D. $13\frac{3}{4}$ m²

b. The fraction $5\frac{3}{7}$ by regrouping is —————

   A. $5\frac{10}{7}$ B. $4\frac{10}{7}$ C. $3\frac{10}{7}$ D. $\frac{38}{3}$

c. If $\frac{4}{7} + \frac{1}{3} = \frac{X}{21} + \frac{7}{21}$, then X = _____

A. 4   B. 3   C. 7   D. 12

d. The measure of each angle in square is _____

A. 45°   B. 90°   C. 100°   D. 180°

e. The point _____ lies on X-axis.

A. (0,5)   B. (1,5)   C. (5,1)   D. (5,0)

f. $6 \times 2\frac{5}{8} =$ _____

A. $15\frac{3}{4}$ B. $12\frac{5}{8}$ C. $14\frac{3}{8}$ D. $15\frac{3}{8}$

g. The cylinder has _____ edges.

A. 2   B. 1   C. 0   D. 3

4. Answer the following.

a. Nermin took $2\frac{1}{3}$ hours to paint a table and $1\frac{1}{4}$ hours to paint a chair.

How much time did she take in all ?

b. Find the volume of the opposite solid.
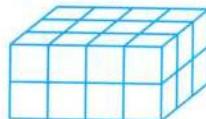
c. Select the expression that represents the problem, and then evaluate it.

If a turtle can crawl $\frac{1}{2}$ kilometers per hour , how many hours would it take for the turtle to travel 8 km ?

Choose : $\frac{1}{2} \div 8$ or $8 \div \frac{1}{2}$

d. Yara is selling bags of cookies in her friends to make extra money to buy a new bike.

She earns 10 L.E. for each bag of cookies she sells.

Complete the table and then graph the points on the coordinate grid.

Bages of Cookies	Money Earned in L.E.
2	———
4	———
7	———
8	———
10	———
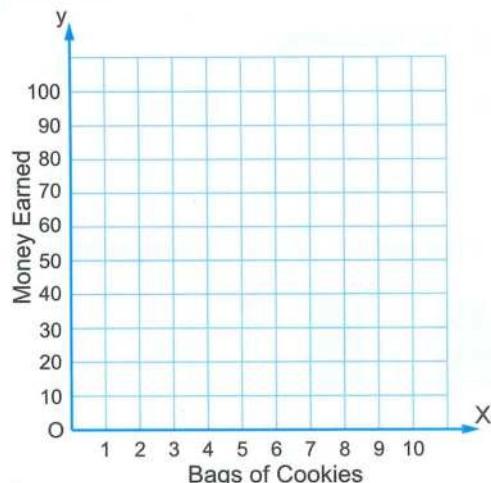
Model **7**

1. Choose the correct answer.

a. The LCM of denominators of $\frac{7}{12}$ and $\frac{5}{18}$ is ———

A. 12   B. 36   C. 18   D. 6

b. If $\frac{1}{3} \times a = 1\frac{1}{3}$, then a = ———

A. 1   B. 2   C. 3   D. 4

c. Volume of opposite cuboid = ——— cm^3

A. 84   B. 49   C. 14   D. 7

d. $\frac{1}{3} \div 3 \square \frac{1}{3} - \frac{2}{9}$

A. <   B. =   C. >

e. The triangle whose side lengths are ——— is isosceles triangle.

A. 4, 5, 3 cm   B. 4, 4, 5 cm   C. 3, 5, 6 cm   D. 2, 3, 4 cm

f. The opposite number line represents ———

A. $9\frac{2}{3} - 6\frac{1}{2}$ B. $9\frac{2}{3} + 6\frac{1}{2}$

C. $2\frac{5}{6} + 6\frac{1}{2}$ D. $6\frac{1}{2} - 2\frac{5}{6}$
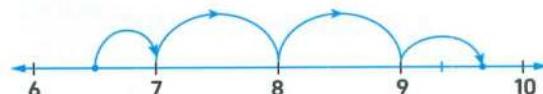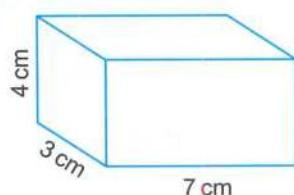
g. If $\frac{3}{7} + \frac{6}{7} + \frac{6}{7} = b \times \frac{6}{7}$, then b = _____

A. $\frac{6}{7}$ B. $\frac{3}{7}$ C. $1\frac{1}{2}$ D. $2\frac{1}{2}$

2. **Complete the following.**

a. The cone has _____ base.

b. _____ $- 1\frac{3}{4} = 2\frac{3}{5}$

c. The y-coordinate of the origin point is _____

d. + = _____

e. $5\frac{2}{3} = $ _____ $\div 3$

f. $7 - \frac{1}{7} = $ _____

g. Use area model to subtract : $1\frac{3}{4} - \frac{1}{2} = $ _____   ☐ ☐ − ☐

h. The parallelogram with 4 sides are equal in length is called _____

3. **Choose the correct answer.**

a. $3\frac{5}{6} \times \frac{7}{4}$ is _____ $3\frac{5}{6}$

A. less than   B. greater than   C. equal to

b. The area of the opposite rectangle = _____ square units.

A. $8 \times 4\frac{1}{2}$ B. $4 \times 2\frac{1}{2}$

C. $4\frac{1}{2} \times 2$ D. $4\frac{1}{2} + 2\frac{1}{2}$

1	1	1	1
1	1	1	1
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

c. $13 \div 7$ equals each of the following except _____

A. $1 + \frac{6}{7}$ B. $1\frac{6}{7}$ C. $\frac{26}{14}$ D. $1 \times \frac{6}{7}$

d. Length of cuboid = _____

A. $l \times w \times h$ B. $\frac{volume}{w \times h}$ C. $\frac{base\ area}{h}$ D. $w \times h$

e. $2\frac{3}{5} + $ _____ $= 3\frac{1}{4}$

A. $\frac{13}{20}$ B. $1\frac{4}{5}$ C. $1\frac{2}{5}$ D. $1\frac{1}{4}$

f. $2\frac{1}{3}$ hours = —————— minutes.

    A. 120   **B.** 150   **C.** 140   **D.** 130

g. If $8\frac{3}{C}$ is slightly less than $8\frac{1}{2}$, then C may be ————

    A. 7   **B.** 4   **C.** 2   **D.** 15

4. **Answer the following.**

    a. In the opposite coordinate plane :

        1. Graph the figure ABCD where
            A $(2,8)$, B $(3,4)$, C $(8,4)$ and D $(7,8)$

        2. What is the name of the figure
            ABCD ?

        3. What is the length of $\overline{AD}$?

        4. $\overline{AD}$ // ———————— , $\overline{AB}$ // ————————

    b. If the price of each book is $10\frac{1}{2}$ L.E.
       Find the price of 8 books.

    c. The opposite figure shows the percentages of sales
       of different types of books. **Complete :**

        1. The sales fraction of science books is ————————

        2. The least sales fraction is in ————————

    d. Jomana likes chocolate. One day she bought a chocolate and
       ate $\frac{2}{9}$ of it in the morning and $\frac{2}{3}$ in the evening.
       How much part of the chocolate has she eaten ?
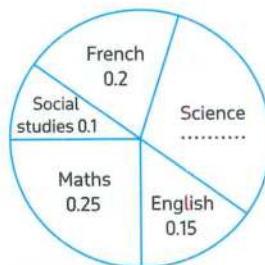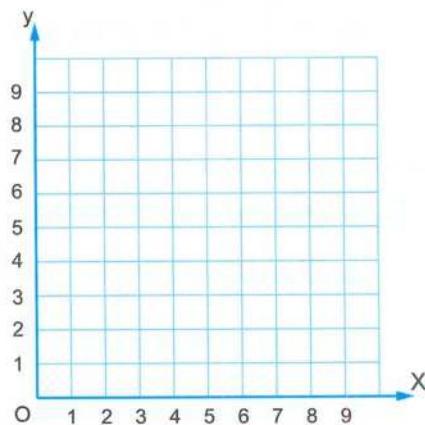
Model   8

1. **Choose the correct answer.**

    a. The polygon which has one pair of parallel lines is called ————————

       A. square.   **B.** rectangle.   **C.** rhombus.   **D.** trapezoid.

    b. If $X + 5\frac{1}{4} = 7\frac{3}{4}$, then X = ————————

       A. $2\frac{1}{4}$ **B.** $2\frac{1}{2}$ **C.** $\frac{1}{2}$ **D.** $\frac{1}{4}$

    c. $\frac{1}{4}$ year = ———————— months.

       A. 3   **B.** 4   **C.** 6   **D.** 12

51

   d. The X-coordinate of the origin point is —————

   A. 0   **B.** 1   **C.** 2   **D.** 3

   e. The sphere has ————— edges.

   A. 3   **B.** 2   **C.** 1   **D.** zero

   f. If $2\dfrac{3}{j}$ is a little greater than 2 , then j may be —————

   A. 2   **B.** 4   **C.** 6   **D.** 17

   g. If $\dfrac{5}{3} - \dfrac{2}{3} = a$, then a = —————

   A. $\dfrac{7}{3}$ **B.** $\dfrac{3}{3}$ **C.** $\dfrac{1}{3}$ **D.** $\dfrac{2}{3}$

2. Complete the following.

   a. If $a \times \dfrac{3}{4} = 2 \times \dfrac{3}{4} + \dfrac{1}{2} \times \dfrac{3}{4}$, then a = —————
        b. The cube has ————— edges.

   c. Area of rectangle = ————— × —————

   d. Use the number line below to find : $7\dfrac{5}{6} - 4\dfrac{1}{4} =$ —————
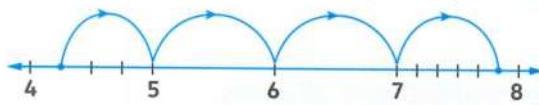
   e. $\dfrac{1}{6}$ year = ————— months
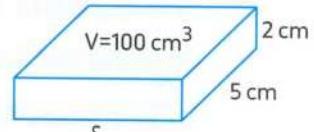
   f. The missing dimension in the opposite cuboid is ————— cm.

   g. In $\triangle ABC$, AB = 5 cm , BC = 7 cm and AC = 3 cm , then the triangle is —————

   h. If $3\dfrac{1}{2} + b = 7$, then b = —————

3. Choose the correct answer.

   a. The ————— has five vertices and five faces.

   A. cone   **B.** cuboid   **C.** square pyramid   **D.** sphere

   b. If $\dfrac{1}{2} \div 3 = X$, then X = —————

   A. $1\dfrac{1}{2}$ **B.** $\dfrac{1}{6}$ **C.** 6   **D.** $\dfrac{2}{3}$

   c. $5\dfrac{3}{7} + 2\dfrac{1}{11}$ can estimated as —————

   A. 7   **B.** $7\dfrac{1}{2}$ **C.** 8   **D.** $8\dfrac{1}{2}$

   d. $15 \div \dfrac{1}{2} =$ —————

   A. $\dfrac{15}{2}$ **B.** $7\dfrac{1}{2}$ **C.** 30   **D.** $\dfrac{2}{15}$

e. The cuboid has ———— edges.

    A. 14   **B.** 8   **C.** 20   **D.** 12

f. The opposite shaded area model represents ————

1	$\frac{1}{2}$
1	$\frac{1}{2}$

    A. 2×1 **B.** $1\frac{1}{2} \times 2$

    C. $\frac{1}{2} \times 2$ **D.** $2\frac{1}{2} \times 2$

g. $15 \div 4 =$ ———— $+ 3$

    A. 12   **B.** 3   **C.** $\frac{4}{3}$ **D.** $\frac{3}{4}$

---

4. Answer the following :

  a. Select the expression that represents the problem , and then evaluate it.

     It takes Aya $\frac{1}{3}$ of an hour to model 4 identical clay figures. **How long does it take for Aya to model one clay figure ?**

     Choose : $\frac{1}{3} \div 4$ or $4 \div \frac{1}{3}$

  b. The following tables shows the expanded money for 5 days of Yasser and Jana Represent the two tables on the coordinate grid with two line graphs.

Days, x	1	2	3	4	5
Expand of Yasser, y	4	11	15	18	20

Days, x	1	2	3	4	5
Expand of Jana, y	2	10	15	20	25

  c. In the opposite pie charts.

    1. The fraction of Football is ————

    2. The fraction of Tennis is ————

    3. The fraction of Handball is ————

  d. In the school break , Hany spends $\frac{2}{3}$ of the break in eating and $\frac{1}{5}$ of it to take a drink , then 4 minutes left. **What is the break time ?**
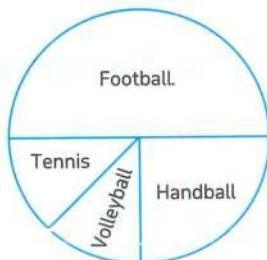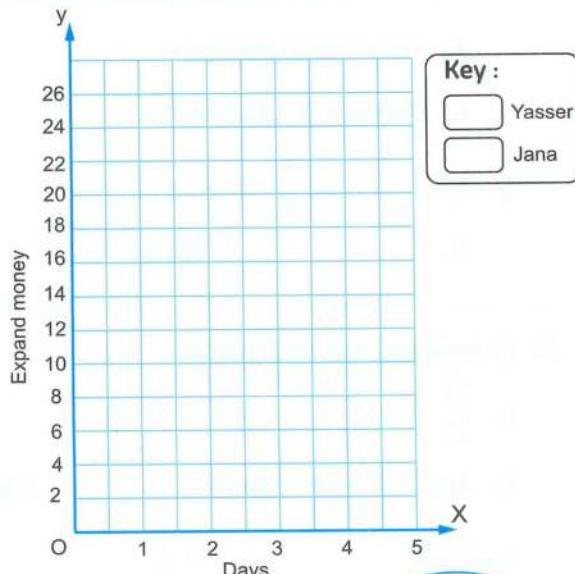
Model 9

1. Choose the correct answer.

a. If $3\frac{4}{7} - X = 2\frac{1}{7}$, then $X = $ _____

    A. $\frac{3}{7}$ **B.** 1   **C.** $1\frac{5}{7}$ **D.** $1\frac{3}{7}$

b. 120 seconds = _____ minutes

    A. 1   **B.** 2   **C.** 3   **D.** 4

c. The fraction $\frac{3}{4}$ is equivalent to _____

    A. $\frac{9}{16}$ **B.** $\frac{9}{12}$ **C.** $\frac{4}{3}$ **D.** $1\frac{1}{3}$

d. In the equilateral triangle the side lengths are _____

    A. 4, 5, 3 cm   **B.** 4, 4, 5 cm   **C.** 4, 4, 4 cm   **D.** 3, 5, 6 cm

e. $\frac{4}{11} \times 0.5 = $ _____

    A. $\frac{2}{11}$ **B.** $\frac{20}{11}$ **C.** $\frac{4}{5}$ **D.** $\frac{55}{4}$

f. Which of the subcategories could include between square and rectangle ?

    A. Four right angles   **B.** Parallel lines

    C. Perpendicular lines   **D.** All of the above

g. If $17 \div 8 = a\frac{1}{8}$, then $a = $ _____

    A. 2   **B.** 8   **C.** 17   **D.** 1

2. Complete the following.

a. $\frac{24}{28} = \frac{}{7}$

b. Area of rectangle = _____ × width

c. $2\frac{3}{4} + $ _____ $= 3\frac{1}{2}$

d. The regrouping of $4\frac{3}{5}$ is a $\frac{8}{5}$, then $a = $ _____

e. 2 years = _____ months.

f. $4 \times \frac{1}{4} = $ _____

g. $2\frac{2}{3} - $ _____ $= 1\frac{1}{2}$

h. The cylinder has _____ bases.

3. Choose the correct answer.

a. $3 \div \dfrac{1}{5} =$ _____

    A. $\dfrac{3}{5}$ **B.** $\dfrac{1}{15}$ **C.** 15   **D.** $\dfrac{5}{3}$

b. If $5\dfrac{7}{f}$ is slightly greater than $5\dfrac{1}{2}$, then f may be _____

    A. 13   **B.** 7   **C.** 5   **D.** 57

c. I am a triangle with only 2 equal sides , the measure of one of my angles is greater than 90°
   What kind of triangle am I ?

    A. Isosceles , right   **B.** Isosceles , obtuse

    C. Scalene , obtuse   **D.** Isosceles , acute

d. The rhombus which has right angles is called _____

    A. rectangle   **B.** trapeziod   **C.** square   **D.** pentagon

e. $\dfrac{4}{3} \times \dfrac{3}{5}$ is _____ $1\dfrac{1}{3}$

    A. less than   **B.** greater than   **C.** equal to

f. Volume of opposite cuboid = _____ cm^3

    A. 15   **B.** 120

    C. $\dfrac{6}{5 \times 4}$ **D.** $6 + 5 - 4$

5 cm
4 cm
6 cm

g. The pentagon has _____ sides.

    A. 3   **B.** 4   **C.** 5   **D.** 6
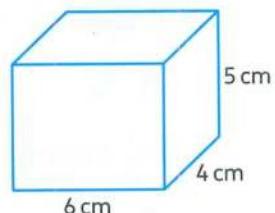
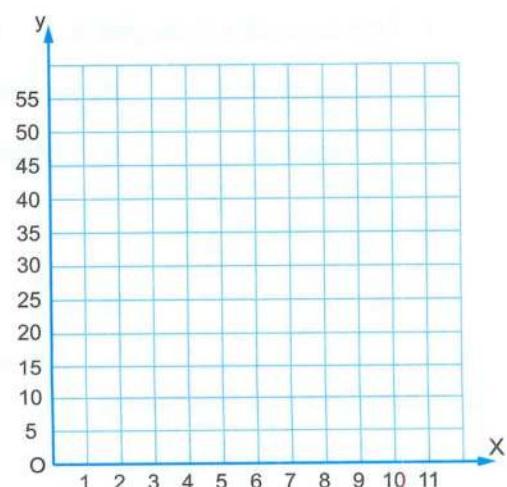**4.** Answer the following :

a. Giovanni earns $7\dfrac{1}{4}$ L.E. for an hour. He works 4 hours per day , 5 days per week.
   How much money does he earn per day ?

_____

b. Represent th following tables on the coordinate plane.

x values	1	3	5	7	9	11
y values	5	15	25	—	—	—

c. How many sevenths in the number 7 ?

d. In the opposite circle :

1. Shade in $\frac{1}{2}$ of the circle green

, $\frac{1}{4}$ of the circle red , $\frac{1}{8}$ of the circle blue

, $\frac{1}{8}$ of the circle yellow.

2. If this pie chart represents 40 students surveyed how many students of the green and blue sections represent ?

Model 10

1. Choose the correct answer.

a. In $\triangle ABC$, if m $(\angle A) = 46°$, m $(\angle B) = 38°$ and m $(\angle C) = 96°$, then the triangle is —————— angled triangle.

   A. an acute
   B. a right
   C. an obtuse
   D. straight

b. If $\frac{10}{11} \times 1\frac{1}{2} = \frac{10}{11} + \frac{b}{11}$, then b = ——————

   A. 10
   B. 11
   C. 1
   D. 5

c. $2\frac{1}{2}$ hours = —————— minutes

   A. 120
   B. 140
   C. 150
   D. 160

d. You are making a design using a quadrilateral with 2 pairs of parallel sides but no right angles. What shape could you use ?

   A. Rectangle
   B. Rhombus
   C. Trapezoid
   D. Kite

e. The y-coordinate in the orderd pair (1 , 8) is ——————

   A. 1
   B. 8
   C. 1 + 8
   D. 8 − 1
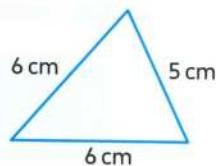
f. The opposite triangle is ——————

   A. equilateral.
   B. isosceles.
   C. scalene.
   D. obtuse.

g. $1\frac{5}{8} + 2\frac{7}{12} + \frac{1}{4} =$ ——————

   A. $3\frac{7}{12}$
   B. $4\frac{5}{6}$
   C. $4\frac{7}{12}$
   D. $4\frac{11}{24}$

2. Complete the following.

a. The rectangular prism has —————— vertices.

56

b. If $9 \div k = 126$, then $k =$ _____

c. $[4 \times 2] + [4 \times \frac{2}{7}] = 4 \times$ _____

d. $\frac{1}{2}$ year = _____ months.

e. If $k - 1\frac{5}{9} = 2\frac{5}{9}$, then $k =$ _____

f. The product of $\frac{4}{5}$ and $\frac{3}{3}$ is _____

g. The pieces of cards △ △ △ △ ☐ can form _____

h. _____ $+ 2\frac{5}{7} = 4\frac{3}{14}$

---

3. **Choose the correct answer.**

   a. If $\frac{3}{7} \times k = \frac{3}{7} \times 1 + \frac{3}{7} \times \frac{1}{5}$, then k may be _____

   A. $\frac{3}{7}$ **B.** 1   **C.** $1\frac{1}{5}$ **D.** $1\frac{3}{7}$

   b. The cuboid has 6 horizontal layers and 2 cube units in each layer, then its

   volume = _____ cube units

   A. 8   **B.** 12   **C.** 4   **D.** 3

   c. $\frac{2}{3} \times \frac{3}{8} \times \frac{8}{9} =$ _____

   A. $\frac{1}{3}$ **B.** $\frac{2}{9}$ **C.** $\frac{13}{20}$ **D.** $\frac{2}{17}$

   d. $0.25 \times \frac{6}{7} =$ _____

   A. $\frac{1}{14}$ **B.** $\frac{1}{7}$ **C.** $\frac{3}{14}$ **D.** $\frac{2}{7}$

   e. Which of the following is equivalent to $\frac{5}{6}$?

   A. $\frac{15}{16}$ **B.** $\frac{10}{8}$ **C.** $1\frac{1}{5}$ **D.** $\frac{20}{24}$
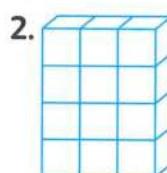
   f. If $4\frac{h}{54}$ is slightly greater than $4\frac{1}{2}$, then h may be _____

   A. 20   **B.** 4   **C.** 28   **D.** 54

   g. The opposite area model represents _____

   A. $\frac{1}{2} \div \frac{1}{6}$ **B.** $\frac{1}{2} \div 3$

   C. $\frac{1}{6} \div \frac{1}{2}$ **D.** $\frac{1}{2} \times \frac{1}{6}$

$\frac{1}{2}$			$\frac{1}{2}$		
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
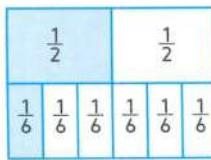
4. Answer the following :

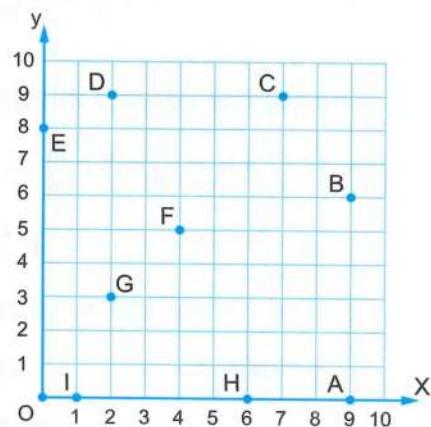   a. Which of the following is greater in volume ?

   1.

   2.

   b. Moustafa is harvesting sugarcane He can harvest $3\frac{3}{4}$ kilograms of sugarcane in 1 hour. If he plans to work for $2\frac{1}{2}$ hours , **how much sugarcane will he harvest ?**

   c. In the following grid, observe and answer.

   What is the name of each of the following points ?

   1. $(0,8)$

   2. $(9,6)$

   3. $(6,0)$

   4. $(2,3)$

   5. $(1,0)$

   6. $(7,9)$

   7. $(4,5)$

   8. $(2,9)$

   9. $(9,0)$

   10. $(0,0)$

   d. For each problem, identify which operation (addition, subtraction, multiplication, or division) should be used to model the situation described.

   1. There are 4 kilograms of hummus. A worker separates the hummus into packages of $\frac{1}{4}$ kg. How many packages will be made ?

   2. The factory's staff is $\frac{5}{8}$ female. How much of the staff is male ?

   3. Fatma feeds her cat $\frac{1}{8}$ of a kilogram of cat food each day. How many days will 4 kg of cat food last ?

58